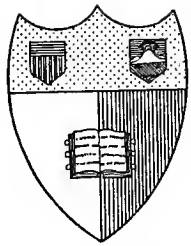
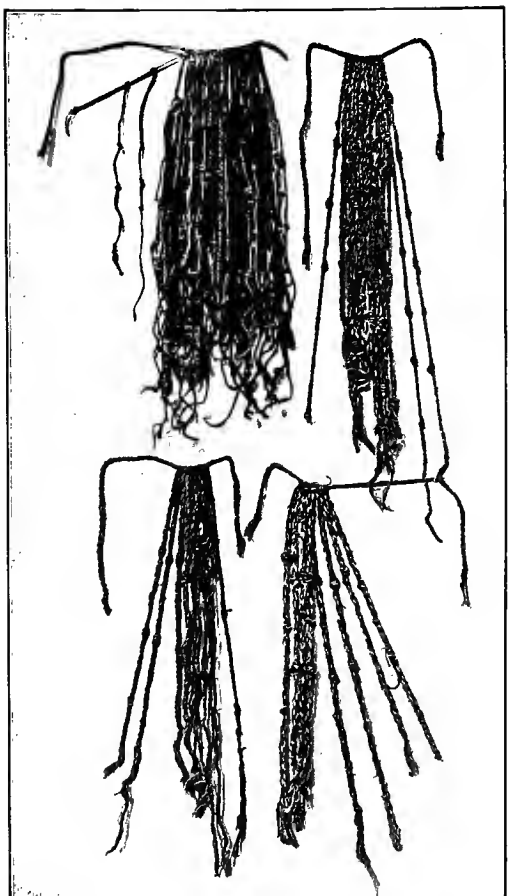


THE BEGINNINGS OF LIBRARIES



A Collection of Quipus
American Museum of Natural History, N. Y.
Nos. B 3453, 8704

THE

BEGINNINGS OF LIBRARIES

BY

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PREFACE

A considerable mass of memoranda on the early history of libraries has been gathered by the author of this essay during the last twenty-five years, and out of this material various essays have been published from time to time on Antediluvian Libraries, Medieval Libraries, Some Old Egyptian Librarians, etc. The fact that the unworked mass of modern information through excavations is so great as to put off for a long time still a systematic treatise, has led to the plan of publishing these essays and addresses from time to time as completed and in uniform style. Although written for very different audiences and in various methods, each is an attempt to gather information not generally accessible and to be, so far as it goes, either a contribution to knowledge or to the method of knowledge, a sort of preliminary report or investigation in the

field, pending full and systematic report. The nucleus of this essay on the *Beginnings of Libraries* was an address to the Library School of the New York Public Library at the beginning of the academic year 1912-13, and takes its color from this fact, but it has been freely enlarged. The writer owes special thanks to the American Museum of Natural History in New York.

ERNEST CUSHING RICHARDSON.
Princeton University Library,
October 12, 1913.

CONTENTS

LIST OF ILLUSTRATIONS

THE BEGINNINGS OF LIBRARIES

§ 1. *Introduction*

This talk is addressed to those beginning library work as a life work. This connects "library work" with two significant phrases, "those beginning" and "as a life work".

This phrase "as a life work" suggests what is perhaps the chief value of a library school training. The distinction of and main justification for all kinds of higher education is that such education aims to put the student in position to view his work to be done as a whole, and life as a thing to be wrought out as a whole, not to be lived from hand to mouth. Presence at a library school means that the student has had foresight

enough to be willing to spend energy, money, and a good bit of that most precious capital time, in sitting down to draw plans for his life building as a whole instead of starting in to build by rule of thumb.

There are however in this matter two factors—one's self and the library. In order to sketch out one's life work as librarian and live it, one must needs first know what libraries are, what they are capable of becoming and how one can best apply such knowledge and energy as one may have to making these libraries accomplish what they were intended to do for human society. This involves looking at libraries as a whole as well as at one's life work as a whole, and the task of the library school is to give this view of the situation. In the last analysis this is the most important thing which any technical school does for one, this giving the vision of the whole of experience in

one's chosen field in order that one may draw his life plan in view of it. And for that matter, the task of technical education does not differ in this regard from the task of general education, which is simply the vision of the whole of human experience, as a whole, with reference to one's own life among all kinds and conditions of men.

As therefore the field of science and general activities is the Universe, so the field of library science and education is libraries—libraries top and bottom, inside and out, beginning, middle and end and looked on as a whole.

On the other hand the phrase "those beginning" suggests the facts that you are yourselves at the beginning of a course of study, that the school year is at its beginning, that this New York Public Library school itself is still in its beginnings and that library schools in general are only in their beginnings. This in turn

suggests as the topic of this talk three aspects of the matter of library beginnings: the beginnings of libraries themselves, the beginnings of library science and the beginnings of schools for library science. This talk will touch briefly, towards the end, on the two latter topics, but will have chiefly to do with the beginnings of libraries.

§ 2. *The study of beginnings*

At the outset it should be said that the importance of this study of beginnings is in every science quite out of proportion to the importance of the objects studied. Beginnings are by nature small. The highest and best things are by nature the most complex and latest, but the study of the earliest and simplest libraries, like the study of the simplest cell life, is not only useful from several points of view but vital to a right understanding of the more complex. The great vice of technical education of all sorts is its tendency to fix attention on the latest and best only. It is true of course that man's ideas and methods are an evolution—just as his body is. The fact of the accumulation of human experience is the central significant

fact of human civilization. It is the glory of libraries that by reason of this fact they are an indispensable tool of progress in civilization. On the whole, by and large, the latest ideas are in fact best, for they tend to sum up in themselves the total of the useful variations of all preceding ideas, and the main time and attention of a course of education must of necessity therefore be given to the latest and best experience, because it does sum up all that has gone before. This does not, however, lessen the value of the study of earlier ideas on any subject back to the very beginnings, for at any given time and place, the latest idea or method in any field is not necessarily the best. It might be the best: it is in position to build on all previous experience and so become best. We all know, however, that the latest book on a subject is not always the best book. So it is, too, of individual ideas or methods.

This frequent failure of the latest to

be best comes chiefly from lack of knowledge of previous experience. Every year sees library methods put in operation which were tried and found wholly wanting in the last century or it may be, two, three or even five thousand years ago. On the other hand again, every now and then we find that some method or idea, discovered long ago but neglected meantime, is far better than those in common use. This has often been true of great scientific ideas and we have in Mendelism a striking recent example. One must needs therefore study earlier ideas in any field, both in order to be sure that so-called new ideas are not exploded old ones and in order to find whether common practice in any field at a given time is not really the development of an inferior line of evolution.

And, again, from the point of view of science, this study of earlier stages is useful because the simple things are often the

best interpreters of more complex, the early of the late, and it is the vision of the whole in perspective to the very beginning which gives the clue to the real meaning of the latest. "Students have come to realize," says Professor Stewart Paton (in the Popular Science Magazine 8,1912,166), "that in the . . . amoeba, jelly-fish, crab or fish, is to be found the key that will eventually open the book . . . (of) the most complex psychic manifestations." This is true also of libraries—the oldest, smallest and rudest give a clue to the more complex, and it may be added, parenthetically, the library is itself in fact the most complex psychic manifestation in the objective Universe.

Beginnings thus, though small, are the roots of the matter. This is so well recognized in the field of science as to have become an axiom, and in the study of any class of things nowadays the aim is to trace each kind of thing—plant, ani-

mal, idea or social institution back to its beginning. Evolution has taught us to expect a genealogical series back and back to very simple forms and the method of all science has become what is called historical or genetic. Natural science is not satisfied until the most complex animals and plants have been traced back through all their complexities to single cell origins, and, if Browning may be believed, the aim of humane and ethical science too does not rest short of the same effort "to trace love's faint beginnings in mankind".

This study of the beginnings is, moreover, not only at the bottom of the method of modern science but of the method of modern teaching. Every man, it is said, in his life history retraces the history of his race, and the race history of man is above all things a history of developing ideas. This has two aspects significant for the method of teaching. As investigating science must trace every complex

idea back to its simplest beginnings, so teaching traces the idea forward from those beginnings to its latest form. The law by which man in his individual development of ideas must retrace the history of the race applies to every idea or group of ideas and it is doubtful therefore if any one ever learns anything rightly in life unless he patiently follows the idea of it from its simplest beginnings to its latest form—the path being sometimes a steady growth in value, sometimes a rise and fall again towards extinction. The historical method of teaching, therefore, is the only method which can be called natural.

The other teaching aspect of this matter is the very significant fact in child psychology that the general development of the child's mind, like the development of its body, does in fact repeat the history of its ancestors as they passed from gestures and cries to articulate speech and writing and through these from the sim-

plest knowledge to the most complex. The child must therefore, in short, be taken along "the paths upon which in a very real sense every human being has come in person" and the natural method of child teaching must consequently be deduced particularly from a study of the beginnings of speech and writing, books and book collections. In a sense, and in a very real sense, the key to the scientific pedagogy of the future lies in the group of studies summed up as library science, for the library is the late and complex object which sums up in itself the sciences of the book, the word, and all simpler elements of human expression and record, if there be any such. A fourth reason for the study of beginnings is, therefore, that it is the natural method of study and teaching.

Finally and closely connected with the preceding reasons is the fact that the purpose of all science is prophecy. We learn

not so much that we may teach, as the motto says, but we learn that we may foretell. The object of all science is to understand from what has been the relation of cause and effect in the past, what is likely to be the result of any given set of circumstances in the future. Physics, e.g. has proved a very sure prophetic guide. An engineer can tell with precision that a bridge constructed in a certain way will break if loaded beyond a certain point. Load it to that point and his prophecy becomes true. In the same way, with somewhat less precision perhaps, the biologist can prophesy results in the breeding of plants and animals, the physician can prophesy that quinine will help malaria, the farmer that planted seed under certain conditions will or will not on the average produce certain results, and so on through every branch of human activity. We study in order that we may know the conditions which will be

brought about in the future by one or another set of circumstances and so that we may be able to produce the circumstances if we wish the result. The preparation for foretelling may, therefore, be labeled the fifth reason for historical study.

§ 3. *Definition of the Library*

In approaching the actual study of primitive libraries it is necessary to touch a little on definition and method. Both these matters, essential to the approach of any topic scientifically, doubly need some attention at this point, because library history has heretofore not troubled itself much about primitive libraries at all or indeed about libraries for the first two thousand years after they had left their more primitive stages. The very method, therefore, lies chiefly outside the experience of library history, being gathered mainly from primitive art and anthropology, and definition must needs consider what the essential nature of these primitive libraries is that links them with the great libraries of modern times. Discus-

sion of definition is the more necessary in that the already contradictory usage has been still farther confused in the matter of the earlier historical libraries by those who, wishing to distinguish the collection of purely business records, public or private, from the collection of purely literary works by calling the former an archive, have yet applied the term archive, incorrectly, under their own definition, to mixed collections of business and other records.

Many answers have been given to this question: What is a library? All of these imply a book or books, a place of keeping and somebody to do the keeping—books, building and librarian—but some definitions emphasize the books, some the place and some the keeping. Far the commonest words used have been the Greek *bibliotheke* and the Latin *libraria* and their derivatives. The one rather emphasizes the place and the other the

books but both were used sometimes for both library and bookshop. When modern languages succeeded to the Latin the Romance languages kept *bibliotheca* for library and *librăria* for bookshop. Germanic languages on the other hand kept both words for library, although in the course of time German has nearly dropped librerei for bibliothek, and English has quite deserted bibliotheke for library. Both English and German call "book shop", or "book business", what French, Italian and Spanish call "library".

Library is thus the common modern word in English for a certain something which the German calls Bibliothek, the Frenchman bibliothèque and the Italian, Spaniard, Scandinavian and Slav call by some similar name. This something in its last analysis is a book or books kept for use rather than kept for sale or for the paper mill. A library is thus a book or books kept for use.

Among the many definitions of the library which do not recognize use as the library's chief distinction, the commonest are perhaps those which adopt plurality or collection as the distinguishing factor. Many however adopt the building as chief factor. Typically, of course, the modern library does include many books, a whole separate building and a librarian, but even if the books are few, the place only a room, a chest, a bookcase, or a single shelf, and even if it is only the owner who is at the same time the keeper, it is still recognized to be a library if the books are kept for use and not for sale. Quantity does not matter: the point which divides is the matter of use or sale. Even a one book library is, in fact, a library just as much as a one cell plant is plant or a one cell animal is animal. A one book library is a very insignificant affair compared with the New York Public Library with its many books and many

branches, but it is just as truly a library—or else you must find some other word. In point of fact "library" in English, or some derivative of *bibliotheca* in most other languages, is the word which in practice stands to the book-for-use as the word animal or plant does in biology for the living thing whether it is a single cell or a cell complex.

Some definitions again try to limit the library to printed books or bound books or literary works as distinguished from official or business documents, and these definitions have, as before said, sometimes led to a good deal of misunderstanding. Even if "archive" is assumed to be the right name for a collection of business documents, still such a collection is simply one kind of a library. Every one recognizes this when the collection of business documents is one of printed and bound public documents (U. S. public documents e.g.), and if the documents

are tablets, rolls or folded documents, the case does not differ. If books are kept for use it makes no difference whether they are of wood, stone, metal, clay, vellum, or paper, whether they are folded documents, rolls or codexes, whether they are literary works, government or business documents: if intended for use they form a something for which some word must be found which will apply equally to all kinds of records for use and to a one-book-for-use library as well as to the New York Public Library. The right word in the English language seems to be this word "library". The "business documents" in active current use in the registry or the counting house are perhaps the farthest away from the "library" of common speech but they are equally far from "archives" in the scientific sense, and curiously these have retained one of the very simplest and oldest names of the true library, "the books", and of librarianship "book keeping".

But the definition of a library as a book or books kept for use only brings us up against the farther question, What is a book? To this it may be answered that a book is any record of thought in words. Here again neither size, form, nor material matters; even a one word record may be a book and that book a library. This leads again however to still another question: What is a word? Without stopping to elaborate or to discuss definitions in detail, we may take the next step and define a word as "any sign for any thing", and again explain the sign as anything which points to something other than itself. This is not an arbitrary definition but one founded in modern psychology and philology and to be found in sundry stout volumes by Marty, Leroy, Wundt, Dittrich, van Ginneken, Gabelentz, and others. The sign may be a sound, a color, a gesture, a mark or an object. In some stenographic systems a single dot stands for a whole word.

The most insignificant object, therefore, kept to suggest something not itself may be a library. A single word book is of course a very insignificant book indeed, and the single letter, single word, single book library a still more insignificant library, but, unless you invent other words for them, they are truly book and library, and there is no more reason to invent another word for book or library in this case, than another word for animal when it is intended to include both the amoeba and man. The very simplest library consists therefore of a single recorded sign kept for use. It is the feeble faint beginning of a library but just as much a library as the New York Public Library, the Library of Congress, the British Museum, or the Bibliothèque Nationale—and the beginning of library wisdom is to seek out diligently the nature of these rudimentary libraries.

§ 4. *Method*

So far for definition. Now a word or two as to method. In this search for the earliest history of the making and keeping of records, library science, like all the human sciences, has at least three ways of approach or sources. The first source is history. This includes the evidence from written documents (which is direct and is history proper) and the evidence from monuments (which is circumstantial and is archaeology proper).

The second source is the custom of primitive or uncivilized nations of recent times: this is comparative library science. The modern idea of evolution implies that these primitive peoples are simply cases of arrested or retarded development—they, having branched off from a common stock

at an early stage of development or else having only slowly developed in parallel natural lines. Their customs therefore, it is alleged, truly represent early mankind when it was at a like stage of development. With this evidence belongs also the rich source of survivals in popular customs among civilized peoples and folk-lore generally; these are things which have kept on side by side with the things which have outgrown them.

The third source is the acts of children while they are developing from the speechless to the speaking stage and from the speaking to the writing stage;—the modern theory being, as has been said, that the child in developing repeats the experience of its ancestors, or, as it is said, "recapitulates the history of the race" in this regard. This is in the same sense perhaps that children's games are supposed by some to reflect the hunting, the wars and the domestic life of their savage ancestors.

These three sources are supposed to cross-check one another and supply gaps in one another, and each might be followed out separately in detail, but for purposes of this talk it will be convenient rather to treat as one historical progress, illustrated from the customs and habits of modern savages, folk customs, and the psychology of children.

That part of methodology which has to do with the bibliography of the subject in its various aspects will be reserved for the end of the talk.

§ 5. *Antediluvian libraries. General*

There are several classes of alleged libraries, which if they have real existence must necessarily precede all others. These include the libraries of the gods, animal or plant libraries, Preadamite and Coadamite libraries and the alleged libraries of the antediluvian patriarchs. All of these may be included under the term antediluvian and the period subdivided chronologically into Adamite or Patriarchal, Preadamite, Prehuman (plant and animal libraries) and Precosmic (libraries of the gods)!

There is a considerable literature on the subject of antediluvian libraries (cf. Schmidt, Bibliothekswissenschaft, 1840, p. 67; Richardson in Library Journal, 15, 1890, pp. 40-44), but this term has been,

until recently, used to include mainly libraries which were alleged to have existed from Adam to Noah. Modern explorations in comparative psychology on the one hand and comparative mythology on the other have however now brought to light many potential or alleged libraries from before Adam—not forgetting that this first ancestor of ours has quite recently been dated some sixty million years before the Christian era!

§ 6. *Libraries of the gods*

The oldest of all alleged libraries are the libraries of the gods.

Almost all the great god families, Indian, Egyptian, Babylonian, Persian, Greek, and Scandinavian, had their own book-collections, so it is said. According to several religions there were book-collections before the creation of man; the Talmud has it that there was one before the creation of the world, the Vedas say that collections existed before even the Creator created himself, and the Koran maintains that such a collection co-existed from eternity with the uncreated God. It is obviously idle to try to trace libraries back farther than this.

Brahma, Odin, Thoth, and substantially all the creator gods who are described in terms of knowledge or words, are each

sometimes in effect looked on by the mythologists as himself an incarnate library and sometimes even the books of which he is composed are specified.

On the other hand, by many all creation was looked on as a library. To the ancient Babylonians the stars of heaven were themselves books in which could be read the secrets of heaven and earth and the destiny of mankind. The whole firmament was thus a library of celestial tablets—tablets of destiny or tablets of wisdom from the "house of wisdom", which was before creation, or carried upon the breast of the world ruler. "The Zodiac forms the Book of Revelation proper . . . the fixed stars . . . the commentary on the margin" (cf. Jeremias. Art. *Book of Life,* in: Hastings ERE.)

This belief, developed into the so-called science of astrology, had a prodigious influence even on the political history of mankind through its effect on the de-

cisions and acts of kings. The conviction that the will of the gods as to future events was here written down, stored up and might be read, was at times the controlling factor in the shaping of human events.

Two of the most famous libraries of the gods are those of Brahma and of Odin. The books of Thoth, equally or more famous, belong to a somewhat different class. Brahma's library contained or was the Vedas—themselves in fact a large collection of various works. These were, it is alleged, preserved in the memory of the omniscient Brahma and at the beginning of this present age they were, in the modern language of an ancient Sanskrit writer, Kalkuka Bhatta "drawn out". Attention has been called to the fact that this library was represented as a classified library with notation founded on the points of the compass!

"From the eastern mouth of Brahma

. . . issued . . . the rich verses . . . From his southern mouth . . . the yajash verses. . . . From the western mouth . . . the saman verses and the metics. . . . From the northern mouth of Vedas (Brahma) was manifested the entire Atharvana" (Muir. 3:12). This library was, it should be noticed, quite up to date in having the special collections kept in separate rooms with separate exits. It was also, it appears, not a mere reference library but books were issued for outside use.

Brahma's library was represented in various other forms e.g., as the milk of the cow goddess or the juice of the Soma plant, and in the same way Odin's collection of words or knowledge is represented in various forms e.g., as the milk of the goat Heidrun, the water of the fountain of memory, the apples of Iduna, which were the fruit of the tree of knowledge and the blood of the wise Kvaser.

That which best identifies the mead, which is the source of the immortality of the gods themselves and without which they languish and die, with books, is the story of Kvaser. Kvaser was the wisest of all the gods (Fooling of Gylfe 54). The dwarfs put him to death and gave out that he had drowned himself in his own wisdom, but in fact they slew him for this wisdom, which was his blood. This was drawn off into a kettle called Odrörer ("that which moves the mind") and mixed with honey was most carefully kept in jars. Drinking out of these jars makes an ordinary man "a poet and man of knowledge" but the mead is most jealously kept to renew the life of gods and poets (Brage's talk 3 sq.) and grudged to mortals. Once Odin, hard pressed in flight, let fall a few drops of this essence of knowledge, and this scanty supply eagerly caught up by mortals produced the rabble of bad poets.

This collection of jar-fulls of knowledge was an obvious library and recalls the fact that almost all the mythologers represent books or knowledge as food or drink, kept in jars. It is not wholly excluded that this great series of myths came from the earliest practice of keeping clay tablets or papyrus rolls in clay jars, precisely similar to the jars in which wine, oil and grain were kept in some treasure houses. But however that may be the soma of India, the haoma of Persia, as well as the Scandinavian mead and the ambrosia and nectar of classical times, were all looked on as concrete knowledge and as such the food and drink of the spiritual or immortal life—a very reasonable philosophy.

These libraries of the gods should not be confused with real collections of books of alleged superhuman authorship like the books of the Old Testament, which are not claimed by any to have been written

before 1200 or 1500 B.C., or the collections of actual oracles delivered at Delphis, Dodona or other shrines, or even with the forged oracles of Greece, or the apocryphal Jewish and Christian books. All these were actual historical book collections and the question whether authorship was really superhuman or not is indifferent at this point which has to do with the libraries which the gods are alleged to have had for themselves before man was.

§ 7. *Animal and plant libraries?*

The modern psychologists, by the science which they call comparative psychology, have gradually been robbing humanity of much that it used to plume itself upon as its own unique possession. Among the last strongholds to yield were reason and language, and the defenders of these, although retreating, are hardly yet put to rout. Even if the articulate speech of the parrot and the jackdaw is only "imitation", and the alleged language of the apes a delusion, still it is something of an open question whether the sounds and gestures which animals use with one another are not really of the nature of language. The fox who doubles on his track in order to lead the dogs on a false scent is getting very close to lan-

guage in a rudimentary sense, and the dog who sits up or barks for food or wags his tail to express good will, perhaps nearer still.

It is a long step, however, from even developed oral and gesture language to record, and it is still generally denied that among the traits of our kinship with the beasts any evidence has been discovered of what can be called record keeping. If this were true, then it would seem to follow that the animal ceased to be animal and became man precisely when he invented and began to practice record keeping—in short that libraries mark the very beginning of the human race!

On the other hand, however, it cannot be ignored that the psychologists are publishing monographs on the arithmetic of animals and the memory for facts among animals, and scores of other monographs on the minds of animals. There are those too who claim that the dog even marks

the place where he caches his surplus of bones, and certainly the bringing home of a dead woodchuck, in order to show his master what he has done, comes very close to that keeping and exhibiting of human trophies which is recognized as among the beginnings of "handwriting". If it is true that the animals do make conscious marks to guide them back to hidden objects, or even that they do have memory for facts, which is true memory, then possibly the beginnings at least of memory libraries and perhaps of external records must in the future be sought in the animal world. The ancient Egyptians, of course, found it there when they made the writing ape author, owner, and keeper of books. Perhaps after six thousand years modern psychology is about to catch up with this idea! Whether or not future psychology discovers anything like actual record collections and memory libraries among the animals, it remains true that

the study of comparative psychology does lead into the beginnings of memory and helps therefore to the study of the real nature of human memory-books and memory libraries, while again it leads into the question of the nature of gesture language, and gesture is the own father of hand-written books. When true libraries have been discovered among animals it will be time enough to take up the question of plant libraries. Nevertheless it may be said that the question of "memory" among plants is seriously discussed and plants may perhaps receive impression as sensitively as animals. It is a little figurative to say that a tree which carries in itself a hundred annual records of its growth is a library in the sense of a public record office which keeps the annals of a nation's growth for a like period. There is however a certain analogy which the discussions of natural records and object writing suggests may even have some

slight germ of scientific interest. Of course where there is memory there may be groups of memorized records which would be collections of very rudimentary "Books", but so far the weight of evidence seems to be against the existence even in animals, let alone plants, of that kind of memory which retains permanently fixed forms of expression. Subhuman libraries may therefore be for the present left to the fabulists and put with apocryphal, legendary and mythological libraries outside the pale of the real or historical libraries.

§ 8. *Preadamite libraries*

Whatever psychologists and mythologists may have to say about libraries before the existence of the human race, there seems to be a surprising consensus of opinion that book collections must have started at latest very soon after man himself. A great number of such libraries are claimed by the ancients for the period between Adam and Noah, and if there were human beings before Adam, as many say, it is likely that there were at least memory libraries, for, as will be seen later in discussing memory libraries, these are almost inseparable from human nature. And further than this it appears from those very same sources, which so fluently allege and describe the library of Adam, that the books of Adam's li-

brary represent such an advanced stage in the evolution of handwritten records as to necessitate a long library history previous to his time. These books included e.g., it is said, inscriptions cut in stone, and such inscriptions imply centuries if not tens of centuries of knot and other mnemonic forms of writing, preceding. Therefore if Adam's library was as described in its literature, there must have been, for a long time before, Preadamite libraries!

Moreover if those writers on the Preadamites are correct who hold that Adam was the father of the Caucasian race only, (M'Causland. Adam p. 282), and that Mongols and negroes at least (M'Causland. Babel p. 277) were already existing when Adam was created, then of course all negro or Mongol libraries are preadamite survivals! It is true that such writers represent culture, and by implication libraries, to have been introduced to

the Mongols from the Adamite line and by Cain, but if premises are granted, the inference is complete, that primitive libraries of all kinds at least up to the time of phonetic records were Preadamite in origin and were shared by Mongol and negro races as well as by the Caucasian Adamites! For that matter some of these ancient, if not veracious sources assert that Adam was the inventor of the alphabet, which makes the matter even clearer, throwing even syllabic written libraries, not to mention ideographic libraries, back into the Preadamite period!

For those who care to follow up this fruitful but not profitable subject, some guide to the extensive literature on the Preadamites will be given farther along.

§ 9. *Adamite and Patriarchal libraries before the Flood*

The very considerable literature on Antediluvian libraries which has been already mentioned is, in general, confined chiefly to the line of the patriarchs, whom the various writers on the Preadamites often describe as Adamites to distinguish thus the patriarchal or Caucasian line from its Mongolian and Negro contemporaries—Adam, Cain, Abel, Sĕth, Noah, Ham, etc.

According to some of these veracious historians, on the seventh day of the first month of the first year Jehovah wrote a work on the creation in several volumes, primarily to teach Adam the alphabet, and secondarily, to preserve the record of the creation. This seems to have formed

Adam's entire library, until the fall. After this, however, Jehovah published a new edition of this work in one volume on stone, and added another work on another stone. These were placed by him in a "Beth" or "House" on a mount east of the Garden of Eden, where were also the Cherubim. This was according to them the first library building, and by inference the Cherubim were the first librarians. This library was bequeathed by Adam to Seth and by Seth to Enoch. It formed a part of the library of Noah, and was consulted by Moses, who incorporated, it is alleged, from it the Elohistic and Jehovistic documents into Genesis.

The libraries of Cain, Seth, Enoch and Ham were also famous among these old chroniclers—Seth's for its astrological and astronomical works, and Ham's for the heretical works, which he was not allowed to take into the ark with him.

Far the most famous however of all

these libraries is the library of Noah. It contained that of Adam, with very many additions. At the time of the flood Noah was commanded to bury his books—"the earliest, middle, and recent"—in a pit dug at Sippara—and from this it appears that the library must have been very large since there was room in the ark for all kinds of animals, but not enough for the books.

After the flood this library was dug up by Noah, and preserved in his Beth at Nisibis, or, according to Berosus, was dug up by the sons of Noah, after their father had been translated, and formed the nucleus of the Babylonian libraries. A legend of the digging up of the library still exists, it is said, on the spot, where re-excavations are now going on.

The Hindu account of this library (Sir William Jones' works. I, 288) has an interesting variation. It states that the flood came because, the sacred books hav-

ing been stolen away, men had become wicked. After the deluge Vishnu slew the thief, and restored the books to Noah.

If Cassianus may be believed, however, these buried books were not all of Noah's library since he took with him into the Ark at least a select collection, presumably for use on the voyage.

Nor were these the only libraries supposed to have been in existence when the flood came, for the Egyptian priests told Solon of many libraries which were destroyed by it. One rather wonders at this too, for in those days of course they were apt to make their books fire and water proof (rather than the buildings as now) and the flood should not have hurt them, but if they were in fact destroyed it simply shows that they were made of papyrus, leather or unbaked clay!

These writers not only tell us in detail about many of the books which Noah must have had in his library, but even in

some cases give us a list of the books themselves. We find thus e.g. that the library must have contained the following works at least by Adam (a) "De nominibus animantium", (b) a census report of the Garden of Eden, which included all living things, (c) The 92d psalm, (d) A poem on the creation of Eve, and various other works, all, it is to be presumed, written after the fall; for the very same authentic chroniclers who ascribe these works to Adam declare that he was born at three o'clock, sinned at eleven, was "damnatus" at twelve of one day and driven out of Eden early next morning—which left little time for literary work on his part, one may suppose, while in Eden.

The library must have contained also, if our sources are correct, works by Eve ("conversation with the serpent"), Cain, Seth, Enos, Enoch, Methuselah and others, and various works by Noah himself, including his history of the world

to his own time, written before the flood and published in two editions, one on wood and one on stone.

The surviving samples of these alleged works are not calculated to make one regret anything about the deluge so much as its failure to be more thorough. Take e.g. Adam's poems on the creation of Eve. Imagine Noah's sons, "In the Springtime, when a young man's fancy lightly turns to thought of love", drawing out a tablet or two of this poem for inspiration and reading how calmly the new bride is invited by Adam to "shake hands and kiss him"!

The efforts to date the library of Adam have been various. A *terminus ad quem* is offered by Berosus, who asserts that the capital of the world before the Flood was named "The Library" or the "Book All". He puts this at 250,000 years B.C., but this of course implies considerable development between Adam and the time

when the world was populous enough to need a capital at all. There is, therefore, no necessary conflict between the veracious Berosus and the veracious modern historians of science, who place the *terminus a quo* at sixty million years ago. There is, however, considerable discrepancy between even the later of these two on the one hand and the very earliest of the one hundred and forty different dates between 3483 and 6984 B.C. actually assigned by more timid historians of the beginnings of Adamic civilization. As sober historians are bound to confess that at best the historical evidence for some 243,016 years on the one hand and 59,748,087 or so years on the other of Berosus' date is not wholly continuous and 6984 B.C. may be regarded as about the earliest exact date known to have been ventured for Adamite libraries.

It hardly needs to be added that all these alleged patriarchal books and libra-

ries are apocryphal although many of them have a respectable antiquity of more than two thousand years and most of them belong either to pre-Christian, early Christian or Mohammedan times. They have been by no means without their influence on human thought and on the actions of those who believed their statements to be historical truth. They are therefore not to be ignored in reckoning the influences which have shaped library development.

§ 10. *Prehistoric and historic libraries*

Leaving aside, however, all kinds of imaginary libraries, mythological, fabulous, legendary or apocryphal, we still have for real human libraries a very respectable historical and prehistorical antiquity.

This long period may be divided into prehistoric and historic or beginnings and later history—the prehistoric period or period of beginnings being understood to be the time before chronological record by years, or before the time of abundant and decipherable hand-written records.

On the whole, the term "beginnings", is better for the early periods than the term "prehistoric period". "Beginnings" in this point of view differs from "prehistoric period" simply in overlapping a

very little the shifting and uncertain borderland between the old prehistoric and historic, carrying over just far enough onto the firm land of annual chronological history to insure a safe footing in the field where written records begin to abound.

In the case of books and libraries this line of division is most clearly made at the invention of phonetic writing, and this seems to correspond pretty well in time with the point of abundant written sources and of definite chronological data in the general history of mankind.

In terms of relative chronology this line corresponds fairly with the first dynasty of Egypt. No doubt in its real beginnings it shades back far beyond its distinguishable first appearance at this time, but in broad terms it begins for Egyptians and Sumerians about this time, and even if this was not the earliest point of its appearance, it is the point at which the earliest abundant well dated and un-

derstood phonetic records are found. What time we shall count this to be in terms of annual chronology depends altogether by about 1000 years on whether we accept the views of the school of chronology illustrated by Breasted's History or that for which Flinders Petrie is champion and in the same way with the Sumerian where King stands for the reduced chronology. When doctors disagree, prudent conservatism suggests the acceptance of that minimum amount on which both agree, in this case about 3400 years of the pre-Christian era. Without prejudice, therefore, to the possibility that Flinders Petrie may be right in putting the first dynasty a thousand years or so earlier, and remembering that even Breasted accepts a predynastic historic period extending to 4500 B.C. with a strictly historic period from "the earliest fixed date in the history of the world" in 4241 B.C., the division between phonetic

records and earlier forms of written documents may be taken as falling at about 3400 B.C. At this time the invention of alphabetic writing was still perhaps two thousand years in the future but writing of some kind, mnemonic and picture writing, had already been practised for perhaps two thousand years or even much more. The beginnings, or the prehistoric, prephonetic and predynastic period of libraries, lie therefore back of the phonetic writing of 3400 B.C.—in picture book libraries, mnemonic libraries, object and memory libraries.

§ 11. *The evolution of record keeping*

These four classes of libraries, memory libraries, pictorial object libraries, "mnemonic" libraries, and picture book libraries, form thus the field. All of them existed before what may be called historical libraries ; all are found among uncivilized peoples of all times; all have their faint remainders in popular custom among modern civilized nations, and suggestions of all may be found in child-study. Three of these classes, memory libraries, mnemonic libraries and picture book libraries, correspond to well recognized book forms. The term "mnemonic", which is commonly used to include quipus, message sticks, wampum, and similar records, is itself not a very exact term, since all outward symbols, whether representa-

tive or conventional, are mnemonic. Moreover, what is generally meant by the term is the use as symbols of objects which do not represent or directly suggest their meaning—in short, of object signs with conventional rather than pictured meaning but as a matter of fact image signs with conventional meaning i.e. all ideograms or phonograms are equally "mnemonic" with conventional objects. A better distinction is therefore into the memory libraries, object libraries (including both representative, or pictorial, object sign collections and conventional object sign collections) and image libraries (including also both representative or pictorial images and arbitrary or conventional signs). For practical purposes, however, we may perhaps use the terms, memory, object, mnemonic, and picture, understanding by object, pictorial object, by mnemonic, mnemonic object and by picture, pictorial image, as distinguished

from the mnemonic or conventionalized images known as ideograms and phonograms. To avoid confusion in this matter it must be kept clearly in mind that writing is not picture writing because its symbols are pictures, but because they picture something. If an ox's head or its image (aleph or alpha) stands for an ox it is pictorial writing but if it stands for "divinity" it is ideographic and if, as it usually does, it stands for the sound "a" it is phonetic-alphabetic writing: It is pictorial writing only when it suggests its own meaning.

Again it must be said that pictorial writing is not confined to image writing as is usually implied by the phrase "picture writing" but applies just as well to objects. A real ox's head and horns may mean "ox" or "divinity" or "a" just as well as a painting, drawing or sculpture of it.

Yet again it should be noted that the picture of an ox's head is itself an object

as truly as the head itself. The two kinds of objects might be called real or original objects and image objects but for short "objects" (originals) and "images" serve well enough. Again it should be remembered that an object is not a real object because it is in three dimensions or pictures necessarily drawings or paintings. A petroglyph is as suitable for "picture" writing as a painting (indeed most hieroglyphics are sculptured not drawn or painted). On the other hand a petroglyph is no more an "object" than a painting or drawing is.

With these distinctions in mind the following table of the kinds of symbols used in ancient records will make clear the kinds of primitive libraries.

(A) Objects
  (1) Pictorial
  (2) Conventional (Mnemonic)
    (a) Ideographic (eye images)
    (b) Phonetic (ear images)
      (aa) verbal

(bb) syllabic
(cc) (consonantal)
(dd) alphabetic

(B) Images
(1) Pictorial
(2) Conventional (Mnemonic)
(a) Ideographic
(b) Phonetic
(aa) verbal
(bb) syllabic
(cc) (consonantal)
(dd) alphabetic

For each of these kinds of "written" records there is a corresponding kind of library or record collection.

The question of the order of evolution among these various kinds of record collections is closely bound up with that of the evolution of language and handwriting, the very invention of handwriting probably implying a feeling of need for kept records.

The commonly recognized ways of human utterance are gesture and oral speech—the one appealing to the eye, the other to the ear, and each leaving its rec-

ord probably at different points and in different molecular form in the brain. Hand gesture came in course of time to be the highest type of gesture language, evolving as it did into a highly complex and adaptable type of language, and modern hand writing is simply a form of hand gesture which, by means of ink or lead or chisel, or some other material or instrument, leaves a trail of the hand movement in permanent record.

The question whether gesture language preceded sound language may perhaps be settled by the answer to the question whether in the evolution of living beings the eye preceded the ear. If in the age of reptiles one saw the other glide or the grass move before he heard a swish or hiss, and if he himself first stayed still in order to escape being seen rather than heard, then doubtless gesture language began before sound language, and doubtless again also language began among

men with simple gestures rather than simple cries. The biologists say in fact that reaction to light came earlier than reaction to sound, eye before ear, and if this is true, gesture language doubtless preceded oral speech. But, however it may be about simple utterance, when it comes to the matter of permanent external documentary record of utterance, it is clear enough that the records of gesture preceded the records of sound, and for some six thousand or eight thousand years, more or less up to yesterday, the only permanent records, or records in external material, were gesture records. Even phonetic writing, so called, is not sound record but a record of sounds translated into gestures; writing is a gesture sign which stands for a sound, not a record of sound. It is only within our own generation that, through the invention of the phonograph, oral or other sound utterance has been recorded in permanent ma-

terial and libraries of sound records made possible.

The written recording of even signs for sounds did, however, in the evolution of record keeping mark a very decided advance over all previous methods. It was as great an advance perhaps as articulate speech itself is over gesture language or pantomime, and even greater than the next great step in human evolution, the invention of alphabetic writing. It was certainly a longer step in time from the very first beginnings up to this point than from here to the alphabet, perhaps longer than from 3400 B.C. to 1913 A.D., and the period of premnemonic record collections, therefore, it may be said in all seriousness, is perhaps longer than all later periods of library history put together.

The very first rudiments of record keeping were doubtless developed in the animal mind long before it learned ex-

pression to other animals and are to be found in the results recorded in its very structure, of its reactions to its environment. Certainly they began at the point where any experience, say of contact with an obstacle, left such record that on the next occasion action was taken in view of the previous experience.

The first attempt at expression or the effort of one individual to communicate an idea to another by signs may have been a mere movement to attract the attention of the other to the simple fact of its existence, and the first record of expression may have been the simple memory of this movement in the other's mind.

However this may be, in the course of time and among human beings memory was the first record and as long as life was so simple that a man's memory was sufficient for his own record uses and he felt no need of communicating to a distance, whether in space or time, the ne-

cessity of external records was not felt. As soon, however, as the number of a man's cattle or cocoanut trees, or the contents of his hunting bag got beyond his count (perhaps beyond the number of his fingers and toes) or he felt the need of sending a message of defiance, peace, or ransom to a neighboring tribe, or from a hunting party back to the cave or wigwam, he began to make visible records—objects, specimens, images, and conventional signs of one sort or another. As the art progressed and became more and more complex, pictures of objects and pictures of gestures became the usual form of record until finally these pictures were recognized as standing for certain groups of sounds and phonetic writing had been invented.

Very soon after the introduction of phonetic writing documents began to abound and the chances of survival, therefore, to multiply. The Palermo stone

seems to show that actual records by reign and by year of reign began in Egypt as early as the first king of the first dynasty. However that may be, within a few centuries of this time records and collections of records in Egypt had become abundant and varied, and these contained economic records, records of political and religious events, laws, censuses, etc., at least. In Babylonia too, long before 3200 B.C., there had been collections of laws, and a great variety of economic and religious documents.

In brief it may be said therefore that about 3400, or at least 3200 B.C., the vast number of documents, the firm establishment of phonetic record, the pains taken to insure permanence and the suggestions of methodical arrangement and custody point to the beginning of a strictly historic period.

§ 12. *Memory libraries*

The earliest form of library was, it is to be supposed, the memory library. This term is not fanciful and does not in any sense attempt figuratively to identify the human memory as such with the library. A few years ago this could have been done in an interesting way because a favorite analogy for conceiving the human brain was the system of pigeon-holes with different sorts of ideas classified and put away in their respective compartments furnishing a very exact analogy to a classified library. This analogy is now found less useful than terms of brain paths or other figures, although the actual geometrical location of each word in brain tissue in the case of memory is still not excluded and this possibility must have its bearing

on the psychological study of memory libraries.

What is meant here by the memory library refers to the modern psychological study of inward speech and inward handwriting. This accounts for the existence of inward books and collections of books, and a collection of inward books is obviously a real library. It makes little difference where or how these are kept in the brain. They doubtless imply a library economy at least as different from that of printed and bound books as the books themselves are different from papyrus rolls, clay tablets, or phonographic records, but it is a real collection of books and the psychological study of the place and manner of their housing and the method of their arrangement and prompt service to the owner for his use is not a matter of analogy or figure of speech.

The essence of the book is a fixed form of words. The point is that a certain

form of words worked into a unity is preserved in exactly that form. The author looks at it as a whole, prunes, corrects, substitutes better words for inferior ones, and generally works over it as a man works over a painting or statue. At the end of the process when the book is finished it is a fixed form of words, a new creation, an individuality. The ordinary habit of thought and conversation does not reach this point of fixed forms of words although in the case of very retentive memories, where the complete verbal form of conversation is remembered, it approaches it. In general men seldom remember the exact phraseology when they listen to a sermon or a story. On the other hand, however, the actor or the professional story teller can summon at will the exact verbal form of a great number of works and each of these works is properly a book. This permanent fixing of form undoubtedly implies some substance

in which the words are recorded, but if that substance is the human brain the result is no less a book, a real record in the real substance, than if recorded in outward substance such as stone or ink.

The practice of keeping such inward records of exact fixed forms of words is not only the oldest form of record keeping and one extensively practised in illiterate periods, but it is commonly practised in modern life by orators who speak without notes, and as a method for the teaching of children before they learn to read ("memorizing") as well as afterwards in the schools.

Among savage peoples the medicine man is often a library of tribal tradition although the modern ethnologists agree that he was by no means the only professional repository of tribal records. The ancient Mexicans, for example, seem to have had special secular chroniclers whose business it was to memorize public events,

and to be a sort of walking public records office, memorizing public accounts of all sorts as well as the story of events. According to many critics of the Old Testament this primitive method continued the chief or only method of transmitting records in Palestine for 2000 years after it had given place to writing in Egypt and Babylonia. They hold that the Pentateuch was formed and transmitted by such oral verbal tradition. The Vedic books were, it used to be alleged, gathered and handed down by a rigorous organized system of memorizing, and this has a certain counterpart in modern times in that memorizing of the Confucian books and of the Koran which forms a chief part of the system of education in the respective cases. The strictness with which this method of transmission of memory books has been carried out to the point of fixing every word and even letter is perhaps best illustrated from the

Jewish oral tradition as to the sounds of the vowels which apparently continued oral for centuries before they were represented by the vowel point signs.

Whether blind Homer composed his songs and recited them throughout Greece without reducing to writing or not, he might have done so and would have done as many another before him in doing so. As a matter of fact the excavations of the last dozen years show pretty clearly a pre-Homeric Greek writing, and Homer himself indeed once refers to the written tablet. But however that may be, the race of minstrels began long before Homer and still exists. In the Middle Ages they were each a walking library, often with a very large repertory, and the same is often true to-day among their successors the actors, reciters and the lecturers. The learning of poems and declamations by school children often results in an inward collection of definite

verbal forms in considerable numbers. A more complex form of memory library is that of certain ancients who are alleged to have organized their slaves into a system, each of the slaves being assigned a certain number of works in a certain class to learn by heart and kept ready on call to recite when any one of these should be desired.

These inward or memory libraries may be distinguished into two chief kinds. As a matter of fact there are almost as many different kinds of inward books as there are outward books, but as the two chief ways of expression are voice and gesture, so the records of oral speech and gesture language, received by eye, ear, or touch, and inwardly recorded, are the chief kinds of memory books. These are quite distinct as to their processes of reception and record, and very possibly occupy different areas of the brain. These differences may in part be realized from common obser-

vation, but one must take pains to guard against the assumption that the inward record is a photograph. It is entirely possible that the brain record of the sound "man" differs as much from a picture of a man as the thread of a phonographic record does. The same is true as to the inward record of a picture word or alphabetical handwritten word. The inward record may no more be a microscopic picture than the stenographic sign is. Nevertheless it is not hard to realize that there is somehow within a series of recorded impressions which may be called images, some of which recall sounds and others objects or gestures. The inward language may or may not have to do with sounds. Modern pantomime and the sign language of deaf-mutes and Indians are languages, and it is entirely possible to store in one's mind an exact series of signs telling a story in gesture language, just as it is possible to store the symbols for sounds or oral speech.

One of the most interesting chapters in the antiquities of ancient nations and of modern savage tribes is the story of liturgical rites, sacred dances, symbolic processions, and the like. Savage dances e.g. sometimes rehearse events of the hunt or war or domestic scenes. In many of these cases what may be called historic events are represented and the whole ceremony is a rehearsal of these events, although wholly in gesture expression, with gesture or object symbols and without speech. It is the recital of visually memorized records in visual symbols, but the records are just as truly definite accounts of events, or records, or books if you like, as if they were oral words remembered and expressed by voice or in writing. In religious dances and dramatic religious ceremonies, the traditional representations were of ideas rather than events—the nature of the world and man, the future world and the means of attaining

this,—and these formed groups and sequences of transmitted ideas quite as definite to the initiated as if expressed orally or in writing.

In the ceremonial processions of the Egyptians and in the Greek mysteries, these representations often become very elaborate and were, apparently, in the secret mysteries, often accompanied by oral explanations by the exegete. It is possible that in the case of both Greek and Egyptian mysteries the transmission had even ceased to be exclusive memory transmission, and that written records, or at least mnemonic tokens of some elaborateness, were preserved in the various chests or baskets carried in the ceremonies. However that may be, these were at least the more elaborate historical successors of symbolic dances and other ceremonies, transmitted among primitive men through visual and muscular sense memory, just as poems were preserved in

auditory images and transmitted by oral utterance.

The significant point is that whether the ritual used in the mysteries was transmitted in auditory or visual images, and whether these symbols were external and kept in the basket or chest, which was carried about in the procession, or merely kept in memory, they were, so far as they were separate, complete and stable image-forms, real words, books, and libraries.

§ 13. *Pictorial object libraries*

The simplest and presumably earliest form of outward record is the pictorial object record i.e. an object "in which a picture of the thing is given, whereby at a glance it tells its own story" as Clodd (p. 35) says of the corresponding image signs which form what is commonly thought of as "picture writing". These pictorial objects are distinguished from mnemonic objects (quipu, abacus, etc.) as pictographic image writing is from ideographic and phonetic writing, by the fact that in themselves they suggest somehow the things meant while mnemonic objects or images require previous agreement or explanation.

The pictorial objects used for writing may be whole objects or parts of objects

and they may stand for individuals or for classes of things, e.g. a goat's head may stand for a certain wild goat killed on a certain hunting trip or, with numbers attached, it may stand for a herd of domestic goats.

The earliest records were no doubt whole object records of individuals. When the hunter first brought home his quarry this had in it most of the essential elements of handwriting (those left behind could read in it the record of the trip) and when he brought useless quarry, simply to show his prowess, it had in it all the elements of the record, as has in fact the bringing by a dog of a woodchuck to his master or the bringing home by a modern boy of a uneatable string of fish to "show". The bringing home from war of living captives to be slain, or dead bodies to be hung from the ship's prow or nailed on the city gates, has the same motive and the same record character. So

too the hanging of criminals on gibbets has the character both of the record-book and the instruction book. In these cases the very object itself is kept and exhibited —the whole object (though without life). Perhaps the nearest approach to the whole object library, in the sense of a permanent collection of records, was when all the permanent spoils of a campaign were "devoted" or "laid up" and kept together for memorial rather than economic purposes in the treasury of the temple.

A strict modern illustration of this case is a collection of battle flags taken or carried in a certain war, campaign or battle. Or again if a modern hunter should have all the spoils of a certain hunt stuffed and mounted as a record of the hunt, this would be of the same nature—a whole object record collection with an object to stand for every individual.

The sample or specimen whole object record as distinguished from the individ-

ual record is in modern times extensively known and used in the sale of goods by travelling salesmen. In its rudiments as a means of visible communication of ideas it was doubtless as old and perhaps older even than the keeping of trophies for record. If e.g. man was herbivorous before he was carnivorous then doubtless primitive man scouting for food would bring back specimens for his family just as a modern boy may bring in specimens of the wild grapes or berries that he has found for information of the folks at home. The best modern illustration of the sample or specimen whole object is in museums, menageries, zoological and botanical gardens, and the like, where specimens of various kinds of objects are gathered to stand for classes, without any special regard to the number in the class.

Museums in general illustrate object record. The historical museums generally and collections of historical relics

large and small, together with mineral, plant or animal collections of rare objects, otherwise unknown, or species otherwise extinct (e.g. the American bison) are of the nature of individual whole object records, while all museums come so close to the idea of the library, either in the matter of record or in the purpose of message or information, that one is tempted to describe museums as rudimentary libraries, and libraries as more complex museums. Art museums are in this aspect a sort of transition between the museum proper or whole object library and the library proper or the image-symbol-record collection.

Whole object record is, however, evidently cumbersome, and man, observing this, early learned a fact very significant for the history of handwriting i.e. that for record, reminder, or information, a part of an object may serve just as well as a whole object. This principle of the

abbreviation of signs for the sake of economy is perhaps the most striking and consistent principle in the whole history of handwriting. It is the principle which led not only from the whole to the part and sample but from the part object to the mnemonic object, from object to image, from image to ideogram, and which prevails throughout the whole farther development of phonetic handwriting, during which picture phonetic signs became more and more conventionalized, through syllabic writing into alphabetic, and it is the law which has produced the numerous variations in the numberless historical alphabets, issuing also finally in numberless systems of stenography. This abbreviation is very early found in war trophies and in hunting trophies. In war it was found that the heads, hands, ears or scalps of enemies or even the left hand or right hand or ear, as conventionally agreed upon, was just as good an evidence of

prowess and much more transportable than whole bodies—and Borneo and Filipino head hunters and American Indian scalpers have practised this discovery in very recent times.

In the case of hunting trophies the history was the same. Actual bodies brought back from a hunting trip were not altogether a permanent record, but after the tribal feast or sacrifice (commonly perhaps in earliest times both in one) the head and skin remained and formed a potentially more permanent record. Even in modern times such skins may be kept as wholes—stuffed for museum purposes or as hunting trophies, and they are, indeed, often mounted as rugs with both head and tail attached. In this stage they form what may be still counted as whole object records but from this stage object abbreviation followed as rapidly as in war trophies. If the skin was separated from head and horns for economic reasons,

either was found to serve the purposes of record. A man's collection of pelts e.g. is obviously a collection of hunting records as well as a collection of wealth. The Egyptian determinative for quadruped is, as a matter of fact, the picture not of a whole animal but of a skin with tail and without head. On the other hand, head and horns served equally as well for record as skin and tail, whether the purpose was a mere record of exploits or a record of sacrifices. This precise stage is amply represented in the modern hunting lodge with its heads of moose or other animals, and it is possible that the expression so many "head of cattle" is a relic of this stage.

In each of these cases the principle of the characteristic part obtains i.e. the abbreviation is not beyond the point where the object can be recognized at sight as standing for a certain animal.

The principle of the characteristic part

once established, the tendency to abbreviation for the sake of economy in transportation, storage, or exhibition, led rapidly to the use of the very simplest unmistakable part showing the individual and then to the simplest unmistakable part showing kind. In the case of war-trophies head was reduced to scalp, and this was conventionalized again so that the trophy scalp consisted of a very small portion from a particular point on the head. In the case of hunting trophies, the head was reduced to perhaps ears or horns, tusks or teeth. The process is found definitely illustrated in the Cretan history in the reduction of the ox's head to simple horns in ritual use, and vestiges of this are probably also to be found in the symbolic use of horns on altars, horns on men as a symbol of power, and the like. On the other hand the skin and tail separated from the horns followed the same law of progressive economy and was reduced

perhaps to the tail only (the fox's brush) or the claws (the primitive claw necklaces).

The modern bounty on wolf scalps contains the whole principle of characteristic part abbreviation up to this point in a nutshell. It is the smallest unmistakable readily recognized and nonduplicable part. It is important for individual record that it should not be possible to collect two bounties on one wolf or to boast of two fish caught or two dead enemies, where there has been but one.

It is thus not fancy or jest to say the scalp belt of an American Indian chief (albeit this did not play such a part in the Indian world as is commonly imagined), or the tiger-tooth necklace of the African chief, is a collection of records representing a rather advanced stage of evolution.

Abbreviations in the case of sample records may be carried one step farther

still, for a single eagle's feather or a very small piece of fur shows kind just as well as a head or tail or a whole skin.

Perhaps the best examples of collections of record objects in the most abbreviated forms are, for individual records, the collections of trophies worn on the person, and for specimen records the medicine bag of West Africa.

Individual trophy collections are common to all primitive peoples and everywhere tended towards abbreviated trophies which could be worn. It would be more than rash to trace the use of clothing and all personal adornment to the wearing of trophies as there is some slight temptation to do, but trophy necklaces, feather bonnets, and the like, were certainly worn in many tribes and without very much other clothing, either of protective or ornamental character. The leopard's tooth necklace of the African chief, recording the number of leopards

slain by his tribe, and the feather bonnet of the American Indian, are true record collections. In general all objects of personal adornment among primitive peoples are symbolic, that is, they have meaning and are of the nature of writing. They are kept for record rather than as objects of beauty or for the enhancement of personal beauty. Labrets, for example, are a sign of aristocratic birth, and even if the objects worn are ritual rather than trophy in character, still each one has its symbolic meaning, and the expert may read in each collection a tale of events or of specific religious ideas almost as clearly as in the phonetic words of a printed book.

The West African medicine bag, like other medicine bags, contained a collection of so called fetish objects of all sorts —bits of fur, feathers, claws, hair, twigs, bark, etc., etc.—but the use of these objects was not for medicine or magical

purposes as commonly understood. They formed obviously an object record collection quite in the nature of a collection of books. As each object was drawn out of the bag, the keeper of the bag recited some appropriate tale or formula for which the object stood.

This probably casts light on many other so-called fetish collections of primitive people, as for example those of the North American Indians. "Mooney says, in describing the fetish, that it may be a bone, a feather, a carved or painted stick, a stone arrowhead, a curious fossil or concretion, a tuft of hair, a necklace of red berries, the stuffed skin of a lizard, the dried hand of an enemy, a small bag of pounded charcoal mixed with human blood—anything, in fact . . . no matter how uncouth or unaccountable, provided it be easily portable and attachable. The fetish might be . . . even a trophy taken from a slain enemy, or a bird, animal, or

reptile." (Hodge. HandbAmInd 1 :458.)

These fetishes might be kept in the medicine sack (the Chippewa pindikosan) or "It might be fastened to the scalp-lock as a pendant, attached to some part of the dress, hung from the bridle bit, concealed between the covers of a shield, or guarded in a special repository in the dwelling. Mothers sometimes tied the fetish to the child's cradle." (Hodge. HandbAmInd 1 :458.)

These fetishes represent not only events but ideas (a vision, a dream, a thought, or an action). They represent not only religious and mythological ideas and tribal records, but individual exploits in war or hunting and other individual records. In short, the medicine bag the world over is a collection of recorded ideas, both of historical and mythological character if not also of an economic character.

So far as the "fetish" objects are not

trophy objects, but stand for ideas, they form a transition to the mnemonic object, but so long as the object is such as to suggest to the keeper and expounder the idea of the particular form of words or ideas which he relates, it is still to be counted as object rather than mnemonic writing e.g. if a bit of fox fur suggests a story of a fox, it is still to be counted a pictorial object rather than a mnemonic object.

If twenty eagle feathers, e.g. stand for twenty eagles, or twenty small bits of fur for twenty reindeer, these sample objects are still used pictorially, but if a feather head-dress is made of eagle's feathers, each feather symbolizing some particular exploit, the matter has passed over from the pictorial to the mnemonic stage.

§ 14. *Mnemonic object libraries*

Mnemonic writing, as it is generally treated in the textbooks, includes all sorts of simple memory aids, and is generally, and probably rightly, regarded by writers of palaeography as preceding picture writing, although there is an element of abstractness even in the tally or knotted cord or pebble as compared with the actual imitation or representation of the picture, and in the evolution of human thinking, other things being equal, the abstract necessarily follows the concrete in time and in the order of evolution.

The most familiar examples of mnemonic books are the quipus or knotted cord books, the notch books, which include tallies and message sticks, the wampum belts of American Indians, and the

abacus. Collections of any of these kept in the medicine tent or temple, or even the counting house, are, of course, true libraries, or at least true collections of written documents as generally understood by the historians of writing.

The knotted cord is best known under the name of quipu, which was the name for the Peruvian knot record. At bottom the idea does not differ from the simple tying of knots in a handkerchief as a reminder, or the sailor's log line. It has been most commonly used for numerical records, but in many cases it preserved and transmitted very extensive historical records. One very simple use was the noting on different colored cords by knots the number of the different animals taken to market for sale, and again the price received for these at market.

It is still used among the Indians of Peru and some North American Indians, also in Hawaii and among various Afri-

can tribes, and all over Eastern Asia and the Pacific.

It was the traditional method in China before the use of written characters, and the written characters themselves were, it is alleged, made up out of these combined with the pictures of bird tracks.

Among the ancient civilizations there are many remains or reminiscences of these knot books. They are found among the ancient Egyptain hieroglyphics (as in the sign for amulet and perhaps in several other signs); they appear also in the mnemonic knotted fringes to garments in the Jewish antiquities and, as Herodotus tells us, Darius made use of such knots to guide certain Ionians who remained behind to guard a bridge as to when it should be time for them to sail away. In 1680 the Pueblo Indians of North America marked the days to their uprising in the same way.

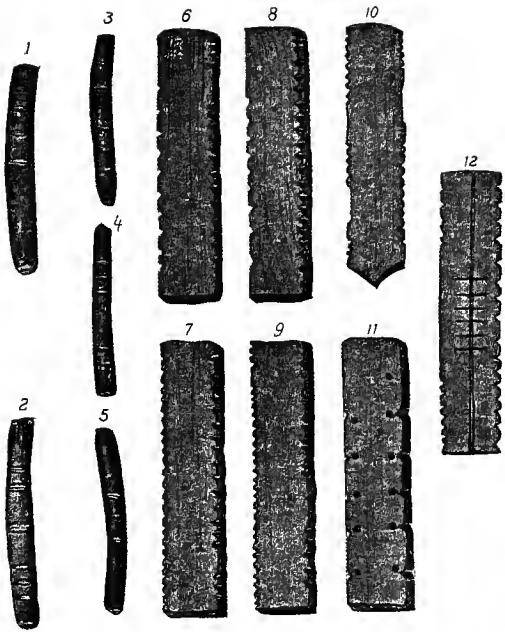
This use of the knotted cord for amu-

lets is among the most widespread of uses, being found among the medicine men of nearly all primitive peoples. Juno wore such an amulet, and Ulysses carried one.

Among the ancient Peruvians and Mexicans there were many collections of quipus in charge of official recorders.

Traces of ancient use survive in the knots of a cardinal's hat and perhaps most interestingly of all in the nautical knot used in casting the log or sounding. We may still travel so many knots an hour or sink mayhap so many fathoms deep. The knotted measuring line with fathom marks is probably the direct historical descendant of the Egyptian measuring line and by the same token probably of the Egyptian sign for one hundred, the fathom like one of the Egyptian units being at bottom the stretch of a man's arm.

Most of the extant quipus have been



A Collection of Message Sticks
From Howitt. Native Tribes of S. E. Australia,
p. 704

found in graves. There is a "very extensive collection" of these in the American Museum of Natural History in New York, and a recent study of these (by L. L. Locke) concludes that they were used purely for numerical purposes and not for counting but for record keeping.

The best known notch books are the message sticks used in Australia and Africa and the tally used in the British Exchequer up to a recent date for the keeping of accounts. This is the method, famous in fiction for the recording on their knife-hilts by Indians and superhuman white scouts of the number of scalps taken in war. It is the essence of the so-called Clog Almanac, the nick-stick, and other ways of notching up accounts still often found in rural communities. The memory of it survives in the use of the word score or so many tallies, used until recently of the runs made in baseball.

Collections of notch records are found

at least among the Australian aborigines —and it will be remembered that it was the burning of the huge collection of tallies in the early part of the last century which resulted in the setting fire to and burning up of the parliament houses.

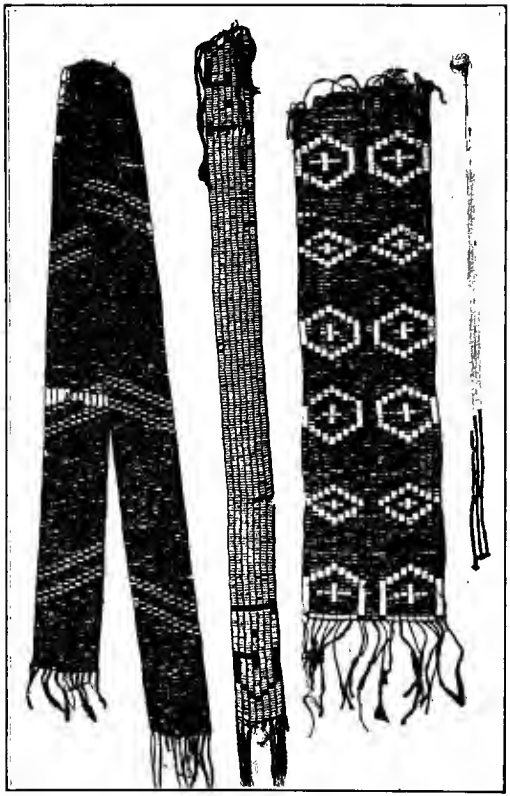
It is possible that the notch method was preceded by a system of stripping off leaves or twigs from a branch, leaving a certain number. The early pictures of Seshait, goddess of writing among the Egyptians, who records the years of a king's reign, suggests possibly this method, and in this case perhaps also the Egyptian sign for year with its single projection may refer to this method.

Wampum is one of the best known and most picturesque forms of mnemonic object writing. It was used by the American Indians for treaties, title deeds, memorials of events, etc., and considerable collections of these tribal records were not uncommon. Although in itself

a later and more complex style, in essence it stands for a style still older than the knot writing which it resembles. Existing examples of wampum leave the simple mnemonic knot or notch far behind and have progressed even to figures or pictures often of an advanced or symbolic type, made in the beads, but the beads themselves stand for what may perhaps be the very earliest form of mnemonic record—that is the object record where each object is represented not by a pictorial object but by some sample object like a pebble or a twig. The heap of pebbles used for counting was possibly the very earliest mnemonic record.

An extremely interesting modern example of calculation in pebbles and the representation by them even of sums in addition, multiplication, and subtraction, turns up among the psychological investigations in the matter of mathematical prodigies. It appears that most of the

famous lightning calculators have been the children of peasants, and a large part of these Italian shepherd boys, who apparently used pebbles for the counting of their sheep and amused themselves by making a plaything of these. Other lightning calculators (Ampère e.g.) used pebbles, and Bidder a bag of shot, while others have taught themselves by the use of marbles, peas, or the use of their fingers. (Bruce in McClure v. 39, 1912, pp. 593-4.) The counting by pebble heaps is found indeed generally in the playing of children. When it comes to transporting or making more permanent collections this was done by means of a pouch in the case of pebbles—one of the earliest forms of record holder and one of the most ancient forms even of phonetic writings, or tying together in bundles as in the case of twig bundles found among primitive peoples, or by stringing together as in trophy necklaces or some forms of the abacus.



A Collection of Wampum
American Museum of Natural History, N. Y.
Nos. 150.1/1945, 1579 A.D. 50/2287, 2902

With these mnemonic object writings is perhaps also to be classed the symbols formed with bits of wood used in the Indian game of cañute described by J. P. Harrington. "The San Ildefonso cañute figures present a symbolism so highly conventionalized and so complex that the term language might well be applied—a symbolism not essentially different in origin or practice from human speech, gesture language, African drum language, conventionalized graphic designs that have a commonly understood meaning, or writing whether executed in pictograms, ideograms, phonograms, or phonetic symbols" (AmAnthropol n.s. 14, 1912, p. 265). "These figures are, it is said, made much in the same fashion as children graphically represent certain ideas by arranging small objects."

§ 15. *Picture book libraries*

Savage tribes in general have not progressed beyond the image stage of writing or at most beyond a sort of syllabic stage which corresponds to what we know as the rebus. This picture writing is the known origin however of all the oldest historical writing systems. As we all know, children too read their picture books long before they read print or writing. Picture writing and picture books have always survived among cultured nations and have a great vogue to-day, especially through the introduction of pictures into newspapers and through moving pictures.

The earliest existing picture writing of the Stone Age includes many images of domestic animals in the caves of the Pyre-

nees with apparently conventional signs sometimes accompanying them. Prehistoric picture writing in the Mediterranean regions includes also pottery marks, figures of animals or parts of animals used to distinguish ships and having their modern counterpart in the ship's figure-head, also the seals, milk-stones of Crete, the rock carvings of Liguria and the like.

The very first beginnings of picture writing are perhaps to be found in natural object images. The Chinese ascribed the origin of their written characters to bird tracks, and many primitive peoples used stones which accidentally resembled animals as images of them.

Perhaps the most natural and earliest reading of records is the reading of footprints of hunted birds and animals. From these tracks the expert woodsman may read the kind and number of individuals passing, the direction that they are taking, and many other details. This fact is fa-

miliar with all hunting, and it is famous in the trailing of both men and animals by American Indians and by primitive people generally. The method is still much used in the tracking of criminals by footprints, and more especially and scientifically in these days by finger-print records. These records are actual images of parts of individuals, and it is not incredible, even if not evidenced, that the earliest use of writing by the Chinese should have been the imitation of birds' tracks in clay by some hunter in order to describe the kind of birds that he had seen.

It has been mentioned at various points in this paper that the record of number is near, if not at, the beginning of permanent records, and Gow, in his History of Greek mathematics, has a theory that the record of numbers above ten began by impressing the ten fingers in the moist earth.

Record Ornament of Imitation Leopard Teeth
From Frobenius. Childhood of Man, p. 27.

Another very early form was the natural rock having some accidental resemblance to bird or beast, or else formed by very slight chipping of a natural image, as in some cases in the Pyrenean caves. Various American Indian tribes used natural fossils or accidental images in this way. The transition from a slight chipping to sculpture is, of course, an easy one.

Perhaps the simplest and most natural transition from pictorial object to image writing is suggested by the trophy records of an African chief as described by Frobenius. The actual record trophies of leopard hunting—the leopard's teeth—are taken and worn in a necklace by the chief and form a tribal record. The individual making the killing has, however, a wooden model of the tooth which he wears as an individual trophy. This very simple and natural proceeding has in it the germ of picture writing,—is indeed picture writing.

Among the more primitive forms of picture writing are tattooing and body painting. Tattooing is used among many savage tribes to-day and all over the world. This was known in the most ancient times and is often practised to-day especially by sailors and boys, sometimes quite elaborately. Among the savage tribes it was used for religious, political, and economic purposes. One use was as identification mark. This might be a tribal mark or individual mark, and in either case is very closely connected with the totem idea. In either case it might also be used, and was used, as a property or ownership mark to which the tattoo mark corresponded. This is perhaps linked with the ancient Egyptian tattooing through the tribal mark of the modern Nubian.

The war paint of the American Indian is as old as the Stone Age in the Mediterranean and is made most curiously inter-

esting by a considerable number of so called Pintadores still existent. These Pintadores form the earliest known step in the history of printing, for they consist of stamps with which the paint could be applied in various figures after the fashion of the modern rubber stamp. These figures, like the war paint of the American Indians, probably had various symbolic meanings according to the figures and the colors used, and it is not beyond the bounds of possibility that there were libraries of printed books in this Stone Age—if by any chance collections of sample impressions from these stamps were kept for any purpose. At any event, when applied they formed what some people would call a living library. Certain tablets possibly used for a similar purpose have been found also among the North American Indians.

Body and face painting naturally preceded tattooing—the latter being simply

a method of making the record permanent. The methods may or may not have arisen from the marks made by the pressure of trophy necklaces, bracelets, etc., on the skin, or from being etched by the sun on the unprotected skin of light complexioned tribes. However they may have arisen, these two methods of skin marking are among the very early forms of record, were often used to record exploits or events, and sometimes to record an extraordinary number and variety of matters. It seems also to be established that these body pictures were sometimes intended as copies of trophy necklaces or other ornaments.

There are many ways beside skin marks in which the idea of image making might have suggested itself to primitive man, inheriting as he perhaps did from an animal ancestry a strong instinct for imitation—the shadow, reflection in water, actual fossils of animals, the etching of

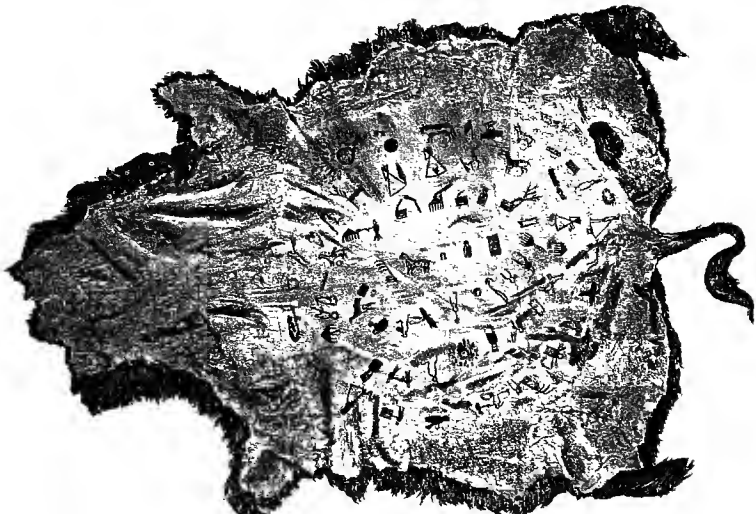
Tupai Cupa's Tattoo Marks, Showing A Group of Various Records
From Parson's Story of New Zealand, p. 16

sunburn, the silhouette of a tree or animal against the horizon, natural stone forms, tracks in clay, etc.—but in skin marks, natural or artificial, we see the transition process in actual operation.

The fact that savages, when they took off their detachable ornaments to go to war or for ritual dances and the like, put on paint, suggests possibly that the painted forms are images of the things removed.

Primitive picture writing on other materials than human skin is found all over the world. It may be drawn, painted, engraved, chiseled, modeled, moulded, woven or inlaid. The petroglyphs or aboriginal rock carvings (more often engravings) and the paintings are the most typical kinds although perhaps not the most common. Both of these kinds are found all over the world; most famously perhaps among the Australians, the Bushmen and the North American Indians. The use by the North American Indians

is said to have reached its highest development among the Kiowa and the Dakota tribes in their calendars. "These calendars are painted on deer, antelope, and buffalo hides, and constituted a chronology of past years. The Dakota calendars have a picture for each year . . . while that of the Kiowa has a summer symbol and a winter symbol, with a picture or device representing some noteworthy event" (Hodge). It is said of the petroglyphs that they "record personal achievements and happenings more frequently than tribal histories . . . are known often to be the records of the visits of individuals to certain places, signposts to indicate the presence of water or the direction of a trail, to give warning or to convey a message . . . and many of them . . . [are] connected with myths, rituals, and religious practices" (Hodge). "Sometimes a man painted his robe in accordance with a dream, or



PICTURE WRITING. LONE DOG'S WINTER COUNT.
SERIES OF VARIOUS RECORDS
FROM MALLERY (1882-3) pl. vi

pictured upon it a yearly record of his own deeds or of the prominent events of the tribe." "The horses of warriors were often painted to indicate the dreams of the war experiences of their riders."

In the matter of abbreviation it was in image writing as in object writing. It begins with whole object images and passes through various stages of abbreviation until it goes over from the pictorial to the mnemonic stage.

In image writing this process has many illustrations running back to the cave drawings where the head or horns of an ox or goat are given instead of the whole animal. This convention was used over the whole Mediterranean region and apparently became the direct ancestor of the Hebrew aleph, the Greek alpha, and our modern English a. The letter a as now used in the alphabet appears to be the end of a long historical process of conventionalizing by which user after user has tried

to simplify the strokes required more and more or, as the modern complacent "inventors" of the ancient principles which they now call "efficiency" would say, "reduce the motions required" until the present form has been reached.

In image writing too is more clearly seen the development of what may be called sample-and-number abbreviation.

The earliest way of representing several animals seems to have been the making several like symbols—one for each. Five oxen, e.g. are expressed by five pictures. It is entirely natural that when a man is writing the same picture several times, one after another, and knows that others will know it to be a repetition, the process of conventionalizing, which goes on so fast under ordinary circumstances, should go even faster, until pictures four and five become simple scrawls and in the course of time the whole is reduced to practically a single picture and four

straight lines. Here we have the individual record and the sample record combined.

True picture writing is not very common on the ancient monuments and is chiefly to be studied in the primitive writings of uncivilized tribes such as the Bushmen and the North American Indians. There are, however, both in the Assyrian and Egyptian hieroglyphics many traces of the older pictures from which these are derived and the idea of the picture writing is seen in great fullness in the determinatives of the Egyptian writing, although it is likely that these are not so much remains as restorations. They consist, as is well known, of pictures which suggest something of the meaning of the word, e.g. all words related to writing are followed by the pictures of the scribe's palette, with pen and ink moistener. This suggests at once that the word has something to do with writing. It is likely that

the attaching of these to phonetic signs was the result of finding that there were so many words which had the same sounds.

A very simple example of picture writing is given in Hoffman (p. 95) with its explanation. A canoe with a torch in the bow, three bucks and a doe, the sign for a lake, and the picture of two wigwams tells the story of a hunting expedition by torchlight on the lake from which three bucks and a doe were brought back to the wigwam. A slightly more complex one is given in Figure 3, which is the record of a shaman's curing of a sick man. A more complex one, given on page 26, with its explanation on pages 170-72, is the mnemonic song of an Ojibway medicine man.

One method of picture writing shows an action by several successive stages of the same act. This is most commonly a picture of corresponding gesture signs.

The picture writing by successive pictures, showing successive stages of a story, is a favorite method in the modern German humorous illustrated papers, and has, of course, its perfect modern counterpart in the cinematograph.

Any collection of wampum belts, birch bark, calendar skins, blankets, or other picture writing records, is of course a picture library which has already begun to take on the distinct character of the modern library.

§ 16. *Ideographic records*

Ideograms are the mnemonic stage of image writing. They may be recognizable pictures but, if so, their meanings have no relation to the picture itself. The head of an ox, for example, when it stands for an ox is picture writing, but when it stands for divinity or for the sound "a" it is an ideogram. All hieroglyphic and alphabetic writing is, therefore, in a way ideographic, but we are accustomed to distinguish phonetic writing and to leave for ideograms proper only those pictures which appeal to eye rather than ear. Some people read even alphabetical printed words as ideograms —the word suggests its object directly without being translated into its sounds. Some, on the other hand, cannot read

even to themselves without thinking in sounds or even moving the lips.

Ideographic records so shade into the picture writing or the pictorial image record on the one hand and into phonetic writing and the book form common and appropriate to phonetic writing on the other, that it is not easy to single out any examples of exclusive ideographic record collections, although of course such collections are entirely conceivable, and the earliest traces of Egyptian or Sumerian hieroglyphics seem to suggest the stage where documents were in ideograms of whole words, but at this stage ideogram and phonogram would be almost indistinguishable as it would be a subjective matter as to whether it suggested to any given individual a visual image directly or only indirectly, through an ear picture.

§ 17. *Types of primitive libraries*

Various illustrations of the different kinds of primitive libraries, possible or actual, have already been suggested. These may be summarized as private record collections and tribal record collections, as pictorial, mnemonic, and mixed, as object, image, and mixed, and as priestly and secular. The matter may be made perhaps a little more concrete by considering two types as to which we do not have to rely on historical allusion, but of which we have concrete examples—votive offering collections and libraries for the dead. With votive offering collections are, of course, to be associated the medicine bag, amulets, magical charm collections, and that whole class of primitive records or symbolic objects which

center in the religious head of the tribe. The libraries for the dead, consisting as they do of objects buried with the deceased, are essentially collections of personal records corresponding with the modern private library. Collections of public records, not kept with the religious collections, are well attested among primitive people, and existed from very early times in Egypt and Babylonia, but on the whole the inference of anthropology seems to be that up to the neighborhood of the historical period the head of the tribe was both priest and king, as the Czar of Russia is both Emperor and head of the orthodox church, and religious and political collections one. The priest king seems to have been the rule even in early historical times, and temple and royal archives one, differentiated only as the numbers of the nation and the complexity of the civilization grew. At all events, we have abundant remains of temple col-

lections of symbolic objects or so-called "votive offerings", including much unmistakable "writing" and we have also a considerable number of examples of similar objects buried with the dead, from very various localities all over the world.

The objects gathered together at shrines are commonly known as votive offerings, but the actual uses and reasons for their collection are much more various than is suggested by the ordinary meaning of the votive offering, while, as a matter of fact, most of such objects are not offerings at all, but only substitute object image records of such offerings, or even mere symbols for offerings. A good type of this latter class is the Chinese sacrifice which consists in writing prayers on a piece of paper and burning the paper. But there are thousands of illustrations in actual collections of something very close to this, throwing most interesting light on the writing character of these collections.

The collections formed very soon after the invention of phonetic handwriting in particular give very clean-cut illustrations of the meaning of many classes of these temple deposits of symbolic and mnemonic objects, and this in turn casts light on the primitive object collections of the shaman and the tribal story teller.

To begin with, a list of the objects found in the Hopi North American Indian shrines, as given by J. W. Fewkes, will illustrate the fact of the varied contents of aboriginal shrines: "The temporary offerings in shrines are prayer meal and pollen, sticks, clay effigies of small animals, miniature bowls and vases of water, small bows and arrows, small dolls, turquoise, shells, and other objects." "Among the permanent objects not offerings . . . human or animal images of wood and stone, concretionary or botryoidal stones, carved stone slabs, and fossil shells" (Hodge).

The historical votive offering collections of Greece, Crete, Egypt, and Babylonia extend over long periods, and the objects recovered from them include hundreds of thousands of record objects. These include, as in the case of the Hopi shrines, a great many objects not intended as offerings at all. The temple treasuries, even in very early times, were used as a sort of general safety deposit vault, the protection consisting not only in the watchfulness of the priest but the tabu, or curse laid upon those who should even approach the objects, and the general belief that they were in fact under the protection of the god who would punish theft. Such objects might be taken again by the owner, as is shown in the case of the Greek temple treasuries, or they were things held in trust by the priests for the benefit of widows and orphans as was the case of the Jewish temple. Moreover, even the record objects were by no means

confined to records of the fact, the nature, and the extent of the offerings made, although a great portion of them were precisely for this record purpose. Increasingly, and at last very extensively, they included records of events of war, hunting, and in later times of the public games. They were in the Greek temples very extensively biographical or genealogical and tended to be so progressively. Indeed vast quantities of tablets "laid up" in the temples had no connection with sacrifice at all but were merely records deposited as one might deposit family manuscripts or present a printed autobiography to a public library. The votive collection was simply a public reference library as distinguished from political archives or school libraries for instruction or learning.

The more strictly votive records were themselves of great variety. They include object records, sample records, models, pictures, symbol records, and

phonetic inscription records. But, whatever the form, the underlying idea or motive is the same, they are records of offerings made, whether those offerings are sacrifice or thank offerings. The treasury of the Greek temple was sometimes a separate building by itself filled with these records. The Jewish temple had separate treasuries for war trophies and for other votive offerings. Primarily, of course, these treasuries were in fact intended for the actual objects—the tithe of the first fruits, the tithe of the spoils taken in war, and the animals intended for sacrifice, but as these were intended for consumption, the records took their place and in later times increasingly images and even verbal statements were used as offerings in place of real objects, forming, so to speak, a collection of fiction or perhaps better, the actual records of real spiritual acts performed, signifying petition, sacrifice, thanksgiving, etc. of the worshiper.

The innumerable tables with record of cattle in the great cattle pens of the Babylonian temples, although perhaps not to be described themselves as "votive offerings", actually correspond to the later practice, where the votive offering is kept as records of offerings, and correspond very closely in the case of war trophies, where it often happened that a part was dedicated and the rest sold or melted down and made into valuable objects which in turn might, in case of need, be converted into cash and have an image or some other record substitute.

After the war trophies and perhaps before them, the most significant class of offerings was that of the first fruits which ranged through the whole field of human production from the fruit of mines, fields, orchards, vineyards, hunting, fisheries, flocks, up through the trades of fuller, potter, baker, tanner, shipwright, washwoman, butcher, cook, basket-maker, shoe-

maker, and so on up to professional men, recorders and the first copy of literary works. When possible the offering might be and was originally in kind, but when not, as in the case of the physician or the recorder, it would be in the shape of money or, more likely in the case of the physician, an image in some valuable substance of the particular operation or disease for which fee was received (e.g. the golden tumors which the Philistines sent to the Jewish shrine). These were extremely common as the free-will offerings or vow payments among those who had been healed. When money began to take the place of barter the replacing of objects by their money value with registry of same in the books of the temple grew with it and became the tithe-tax still familiar in the English language and English society.

An extremely interesting library aspect of these (votive) collections is the actual

phonetically written books which were laid up. These can be best illustrated from the Greek collections of books dedicated, but have their precise technical equivalent in the books which Joshua, Samuel, or Moses "laid up" before Jehovah, and indeed the technical term is precisely that for putting a book into a library or a document into the archives. The Greek collections included literary works, prize poems, hymns to Dionysus, Apollo, Asclepius, etc. These may have been of a strictly votive character, and this is true of many other works by Pindar, Hesiod, Heraclitus, Aristomache, Aristotle, Agathias, Alcaeus, and Solon which may perhaps be first fruits. This might also be true, of course, of the astronomy of Eudoxus, the astronomical table of Onopides, the calculations of Xenocrates and the log book of Hanno. But these at least point to very varied contents of these "votive" libraries. These examples above

mentioned were on varied materials as well, including at least lead, gold, marble, and bronze, apparently, as well as papyrus or leather. Some of the works were in shorthand. While it is not easy to conceive of literary works as first fruits in the earlier period of the primitive writing and for the reason that such forms are themselves a later development, many of the mnemonic objects preserved in primitive collections certainly stand for prayers and hymns as well as narrative records and in the collections of sacred liturgical objects these represented set liturgical forms of words or dramatic procedures which are books in quite a developed sense.

A curiously interesting suggestion which seems to throw light on the literary meaning of votive objects is the statement by Miss Harrison that the sacred tokens of Zeus as god of the storeroom were symbols, not statues, and probably sacred

tokens such as those carried in chests at the sacred processions,—magic spells in short, kept in a jar for the safeguarding of the storeroom. The farther identification of these with the ambrosia and with Zeus himself seems to make rather clear that many of the collections of sacred emblems are verbal documents. The relation of this to what was before said of the keeping of books in jars is obvious, and the fact is suggested that many of the so-called collections of votive offerings are of this character, that is, mnemonic objects, perhaps actual collections of verbal forms.

Libraries for the dead are most familiar and most highly developed in the Egyptian burial customs. From a very early date various books, generally known in their collected state now as chapters of the Book of the Dead, were always buried with the important dead. Another famous example of this burial of phonetic

books with the dead is found in the so-called Orphic or Petalian gold tablets, found at various points from Asia Minor to Italy. The most interesting class, however, from our point of view is the large quantities of quipus which have been found in the Peruvian graves.

All these libraries should be clearly distinguished from other collections of buried books, such as those which the Jews made of worn and mutilated books. They are distinctly collections made for the use of the dead. Some of them are for use during the journey to the Elysian fields, the garden of Aalu, or the happy hunting grounds, some apparently rather for use after reaching them. The Egyptian books are rather clearly associated with the idea of the amulets and the other written charms, though on a higher plane. The idea seems to have been that the deceased should learn them by heart and recite them at various points as passwords

for admission to the various gates or to pass various defenders of paradise. The Petalian tablets are precisely of the same character. In the case of the quipus, and of symbolic emblems generally, the analogy is perhaps rather to be found in the Egyptian models of tools and servants, and the hunting weapons buried with the North American Indians, also children's playthings everywhere, where the point seems to be to supply the dead with their customary instruments for use after they have arrived in paradise.

Other objects of dress, ornament, etc., found in graves, strongly suggest the similar collection during life, where clothing and ornament is personal record of events or achievements in a man's life. Probably not all grave collections include the same elements, but it seems likely that all three elements of personal record, guides to paradise, and libraries for paradise, are to be recognized at one point or another.

The quipus form the clearest example, and the long history of knot amulets suggests that they may have been intended primarily to play precisely the same part that the various parts or chapters of the Book of the Dead played. The equally extensive use, however, of knots for records or reminders, as in the mnemonic fringes, allows the possibility of the individual personal record, and there is, of course, also the possibility that the graves in which they were found were the graves of tribal recorders or reciters who carried with them the implements of their trade in the same spirit that the hunting weapons were carried, or, on the other hand, in the spirit of the suicide of a king's servants that they might serve him in the other world, and of the Ushabtiu substitutes for this. These models of servants, boats, war implements, and the like, in graves seem to be precisely analogous to the miniatures substituted for actual objects in votive offerings.

Burial with the dead of a person's favorite belongings has also to be reckoned with in interpreting these collections. Sometimes all a man's favorite possessions were buried with him, and it not infrequently happens in modern civilized times that a person has a favorite ornament or possession buried with him. It was only yesterday that a man provided for having his cremated body sunk in his favorite yacht.

§ 18. *Contents of primitive libraries*

The various kinds of documents in the several sorts of primitive writing found in the different species of collections have been indicated under the various headings. It is worth while however to gather these up together a little and especially in view of the question of actual origin.

It has been noted that collections of quipu, message sticks, fetishes, personal ornaments, skin calendars, totems, votive objects and other pictorial or mnemonic records in temples, graves, medicine tents, private wigwams, etc., include, in pre-phonetic times, records of personal exploits and events in personal history, family histories, and tribal histories, hymns, prayers, amulets, financial accounts, and economic records of various

sorts, annual registers, contracts, astronomical observations, etc.

All this has its bearing on the actual origin of libraries. Messrs. Tedder and Brown in their excellent article in the latest edition of the Encyclopaedia Britannica say that "the earliest use to which the invention of inscribed or written signs was put was probably to record important religious and political transactions". Now as a matter of fact, the conscious record of events and transactions selected as important for the knowledge of posterity, or even, what was probably a much earlier matter, for evidence of contract or practical memorandum, represents a rather late stage in the evolution of record. It is likely that there were many record collections before this stage was reached, trophy, votive, etc., object records and economic records of various sorts.

In point of fact as King remarks of the

earliest Sumerian records, a large quantity of the earliest records are land deeds, and any one who looks over the cuneiform documents will be impressed with the fact that an enormously large proportion of the existing documents of the early historical period are contracts or lists of cattle or, as in the Cretan excavation, labels, or lists of arrows and other materials laid up in storehouses. Among Egyptian documents too, the annals of the Palermo stone, the earliest systematic annals of Egypt, which incorporate earlier documents from its own time (say 2700 B.C.) to six or seven centuries farther back, are to a considerable extent filled with memoranda of census lists of cattle taken and other lists of possessions. It has already been noticed that among the commonest earliest uses of notch, knot and pebble systems was use for the record of cattle or other numerical lists of possessions.

It would be jumping at conclusions to say that the conventional sign attached to or accompanying the pre-historic animal paintings of the caves were numbers. They may quite likely be ownership marks. It is a curious fact, which has recently been commented on, that these animal paintings are of domestic animals and if so the ownership marks themselves would be pictures of the marks actually branded upon the animals just as such marks are still branded on cattle on the plains and by New England farmers on their sheep. The fact that the tendency seems to be to regard the contents of these caves as religious, and the use of the caves as for religious purposes, suggests an analogy with votive offerings. If the marks are in fact numbers, the combination of figure and number suggests at once the innumerable lists of animals in the Babylonian temple records. Ownership marks themselves are, of course, not

records of events but economic records and are very common before the use of phonetic writing. One very large class of these is the pottery mark which was first applied apparently by the man who made them for himself as an ownership mark and then, as one became more skilled in one thing and another and barter began, it passed into the trade-mark of manufacturers which has survived in the modern trade-mark system.

It does not, of course, follow that the earliest documents were not also religious as well as business and political, or even religious as distinguished from the political. Actual evidence, so far as it goes, seems to point to trophy records and votive records,—and votive records of first fruits or other useful or valuable objects "laid up" are economic records, but the parallel evidence as to priest king, the evidence as to religious sanction for the protection of objects, the hypothesis of

priestly guidance in the tribal meal for fair apportionment of spoils, etc., point to religious supervision of economic matters. In the savage state the rule is that when food is scanty the strong eat what they want and the weak starve—the rule of the wolf pack. The germ of all social order is perhaps the rule that the weak also shall share in limited food. Founded possibly in selfishness—the will to keep the weak alive for selfish reasons, it involves at least power of individual self-control, the considering of remoter ends and a certain social-consciousness. The right sharing of food supply requires a strong hand under savage conditions and every possible sanction of authority. It was quite natural therefore that the common meal "before God" which plays such a large part in primitive custom should grow up—and equally natural that it should be the symbol of peace. The priest, standing for God, divided the of-

fering—no doubt in the beginning the whole food supply—and perhaps "kept" the natural relics of the feast in the way of skins and bones.

Provisionally therefore one may venture the hypothesis that the actual beginnings of record collections were economic under religious direction,—and are to be found in the remains of tribal feasts "before God" although it may be fair to say that the rudiments of the matter already existed when the strong hand of the head of the family or tribe insisted on a fair distribution of food. Specht (p. 11) speaks of the bones of sacrifices as "the oldest approaches to a sort of writing", and of course, the bones on the family plates, so to speak, were as truly records of the parts assigned to them, so far as they went (and if their portions had bones) as the bones of sacrifices! But then there is of course the farther question: Did the first savage who denied

himself for the sake of one of the weak not have the religious motive, and did not the first man who forced a tribe of his fellows to do the same, need to use the religious sanction and invoke the fear of God as well as of his own right arm? And then, equally of course, there is the farther question whether the first man was a savage at all.

In the golden age before the mild and carniverous Abel, before even his fruitivérous and murderous older brother, before the Fall when all were still fruit eaters and fruit eaters only, the tabu was —religious prohibition and religious sanction. And that tabu was on the apples of Iduna, the fruit of the tree of knowledge between good and evil, which springs from the fountains of memory and reflection,—the golden apples of strife which some say give immortality, some death. What is this tree whose fruit is tangible knowledge, the food of the gods and

which was in the beginning with the first man, but a library, and what did those old philosophizers mean by what they set down about the first man and the way they put it? Did they mean that what is food for one is poison for another or simply that to break tabu spells death whether it is body food tabu or mind food tabu? Truth to tell the germ of the library is as early as man's mind—at least.

Back to this point, the beginning of man, we have actual literary "authority" in the person of Specht at least, and nearly back to this point we have good archaeological sources for our collections of written records. There is, however, no authority in literature or in the sources, so far as this lecturer knows, for carrying conjecture back into the territory of the pithecanthropos, who, however, must have made and left similar involuntary records of his gastronomic activities, but

who presumably never observed them or appointed them for memorial purposes.

§ 19. *The administration of primitive libraries*

The question of where and by whom and how books were kept and made ready for users is not one that has been very much discussed although the questions who were the librarians and where were the books kept has been more or less implied in the discussions of temple versus secular collections. Mr. Tedder's dictum that "these records would naturally be preserved in sacred places, and accordingly the earliest libraries of the world were probably temples and the earliest librarians priests" is modified and perhaps at the same time confirmed by the history of pre-phonetic libraries. It is true that in primitive tribes the medicine man is generally a keeper of records, but it is

true also that among the Mexican Indians certainly, and pretty clearly among North American Indian tribes and in many African tribes, the shaman or medicine man is not the only keeper of records. It is true also that in the early Egyptian practice the priests were the keepers of the books whether it was in the temple, archives or the palace archives, but even here it seems to be the fact that there were military records, department records, and local administrative records in the different nomes kept by scribes who were not priests.

The keeping of records must in fact have begun before there was any special place, even the simplest hut or medicine wigwam or cave, set apart for distinctively religious purposes, although the setting apart of such places is apparently as old as the caves of the Stone Age. With these qualifications, the history of votive offerings tends to confirm the

statement that the earliest public or tribal libraries were religious and the corresponding librarians the priests.

In very early times, and in much later times among primitive peoples, even the art of writing itself was often kept as a secret mystery in the custody of priests. The name "hieroglyphics" points in this same direction, and the temple collections of sacred books, the so-called books of Thoth and books of Hermes, point in the same direction. In general, however, this monopoly of letters seems rather to have been a deliberate assumption by the priests, as it is sometimes assumed by savage royalty, rather than the original situation. It applies, of course, rather to newly devised kinds of symbols, such as the vast number of systems of secret writing which have been evolved in all ages, than to the ordinary current record methods. That some of the earliest libraries were secret libraries, however, is

an interesting fact, and one which may throw light on the mysterious collections of shrines and portable collections of objects in the liturgical processions in Egypt.

The methods used by these priest librarians for keeping and using the books form in themselves an interesting and little studied subject of very considerable extent.

The different kinds of writing required different sorts of receptacles. The book chest or bookcase, from which has come through the Greek the common word for library in languages other than English, was the most universal and natural way of keeping almost every kind of tangible record. The wooden chests and clay chests of the earliest historical periods must have extended well back into the pre-phonetic period and have also been found among primitive and semi-civilized peoples. They can obviously be used for

quipus, message sticks, or almost any portable document. The same is true of the clay jar so often used in the earliest historical period. In the case of wandering tribes, however, less rigid or fragile materials are certainly better, and the book pouch was, therefore, in very early, and probably much earlier use than either boxes or jars. The skin pouch, like the skin water jar, is naturally suggested and easily made. This early form survives in the medicine bag, the lawyer's green bag, and the schoolboy's bag as well as in mail pouches for post-office use.

The use of basketry work and perhaps other textile work as bookcase also certainly extended back into pre-phonetic times and is represented in primitive usage.

It is not to be supposed, of course, that in these primitive times there were often separate buildings, such as the later Greek treasuries, or even separate rooms

as in the Egyptian temples, and the archives at Boghaz Keuei and elsewhere, although separate huts for these and especially for "collections of liturgical objects" would perhaps be almost the first use for covered rooms, while sacrificing was still conducted in the open air.

Something like a pouch or wallet must have been used for the marked pebbles of the Stone Age and for pebble counting generally before the grooves and rods of the abacus were invented.

The method of keeping and displaying the books in the boxes, pouches, rooms or buildings, varied of course according to the nature of the document. In the modern library there is a great difference between the machinery necessary to keep and display folded documents, rolled documents, and ordinary bound books. The pouch may have had compartments like a modern purse. Basketry, clay and wood cases did have compartments, one

for each roll, in quite early papyrus days.

In some of the late Babylonian libraries the clay tablets were evidently displayed on shelves but they were more commonly kept in clay boxes or jars, alabaster boxes, and the like, after the general fashion of the treasuries in earlier times and until the quantity became great. Twig records were tied together in bundles, and the stringing together of records was one of the earliest and most extensively used methods. It may perhaps be said that it was the typical method of the earliest records. It is found in the stringing together of trophy objects for wearing on the person—necklaces, girdles, and draped strings of various trophies. It is found also early in the history of the abacus where the perforated pebbles or beads were strung on different rods set in the ground, and it is of course found in the developed abacus. The per-

forations of tablets, bearing the year marks, among the objects from the earliest dynasties at Abydos, suggest a stringing together of these annual records, although it is of course possible that these are labels and the perforations used to attach them to boxes. The analogy with annual records of primitive people, however, suggests this stringing together.

What may be called classification of these libraries is found very early. It is reflected perhaps in the early distinction between temple and palace libraries, and more clearly in the primitive distinction between shamans and secular recorders. The putting of like kinds of works in boxes together, medical works, etc., is found as early as 2700 B.C. in Egypt and quite early in Crete. The labels of Crete point to a classification of objects if not of object records.

When collections are small no cataloguing is necessary excepting in the libra-

rian's mind, and his first mnemonic aid is classification, which is in fact a sort of cataloguing and takes the place of all other cataloguing. It is to be noted that in the very earliest records the librarian goes with the king or the investigating committee when they go to look up the records.

§ 20. *The beginnings of library schools*

The library school is commonly regarded as, and is, in a sense, a product of the last century. Library schools are, therefore, still a new thing. It may not seem so to you who had not been born when some of us were lecturing at that first American library school up at Columbia University, but it is the fact that the teachers of that school are still living and teaching, and there were no schools of library economy strictly speaking when they began. The well fledged library school as an avowed school and independent unit is a product of this generation.

Nevertheless library schools too have had their beginnings. In the immediate past schools or university courses of

palaeography or archival science have been practically library schools. In European countries, where the handling of documents and manuscripts have been so much the more difficult share of the problem that library economy and all the rest has been counted negligible and has in fact been neglected, these were real library schools, in that they were chiefly or wholly intended for and used by those who were intending to be librarians. They taught in fact the things which were most expected of the librarians, just as the modern schools, in teaching almost exclusively business and administrative methods, teach the things which the moderns expect of their librarians. They were and are, therefore, very one-sided library schools, lopsided on the science side, and yet perhaps not more lopsided than our own schools are on the side of library economy.

But the beginnings of library schools

may be found farther back still in the schools of the Scriptoria of the middle ages, where librarians made as well as kept their books, and in the temple schools of Greece and Egypt, where men were trained to all sorts of professions, including the keeping of books. Such schools are alleged in Babylonia as early as 3200 B.C., and more primitive still must be counted the schools for the training in memorizing of ancient India. That some analogies to this training in the keeping of books existed in the collections of mnemonic books is not merely inferred in general but found in the alleged training of keepers of quipus in the use and publication of these records. The same is possibly true in some of the initiation ceremonies of primitive tribes where the young men are presumably taught the use of message sticks, secret languages, and the like. It may fairly be said that these are remote in nature as well as in time,

and yet they are as truly the predecessors of the library schools of to-day, as these of to-day are of the library schools of to-morrow, which are likely to differ very considerably from those of to-day.

It does not take much of a prophet to foresee a radical development in some of our American library schools within a very few years. When for example, the Columbia Library school was starting, manuscripts were so few in this country that their science and economy was a negligible element in instruction—and as for archives, we had plenty of documents but the very name archive, with what it connotes, was foreign and almost unknown in America. Now there are many well recognized archives and some of our collections of ancient manuscripts are numbered by the thousands. Many of you will probably live to see more than one library school equipped with full departments for instruction in palaeography

and archival science, with special curricula for each distinguished from the general course in library economy. Possibly by that time there will also be departments of cartography, engraving and numismatics, each with its corps of instructors. In these respects it was something of a pity that the library school went out of the university, but on the whole it may be doubted if it would have ever had the great expansion or ever have done the great work that it has done for popular education if it had stayed in the university. In several very fundamental respects certainly this New York Public Library is a far better environment for developing a university of librarianship than any university of general studies.

§ 21. *The beginnings of library research*

What we have been saying to-day is only the rough blocking out of a subject for which anthropology and the excavations in the eastern Mediterranean region have furnished and are furnishing an enormous amount of source material, as yet wholly unexplored for library matters. A small part of the material has indeed been roughly explored and has yielded rich results in fields where there was absolutely nothing known before, but the unexplored matter is large and increasing rapidly every day. Library research it may fairly be said is itself in its beginnings, and American research in libraries for the older periods hardly yet begun. Of course, as we know Aristotle had some faint notion of anthropological

methods and all the mythologizing people were, as is very thoroughly recognized now, pursuing a sort of scientific research and expressing and thinking in these figures of speech. In this point of view the myths as to Hermes and Thoth, Seshait and Minerva were, if not research, at least speculation on the origins.

Research, however, as now understood, is the product of modern natural science and goes hand in hand with the doctrine of evolution. In this sense there has already been much good research work in palaeography and other branches of the book sciences in European countries. In America a little real scientific work has been done in palaeography, more in the history of printing and a trifle in some other branches of library science, but the total is small and little or none of it directly connected with the library school. It is likely, however, that in the near future many of the library schools will

be teaching methods of research and giving diplomas which require some real contribution. Possibly they will even have recognized departments for research. Of this movement you will be a part and the character of the development will be in part, possibly in large part, through what you think and do and become during your course here. Probably we have as little notion of what record keeping will be a few thousands of years hence, as the inventor of the knotted cord had of this library school—and yet what we do may perhaps affect the state of things then as the inventor of the quipu, the alphabet, papyrus, vellum, printing, the photograph, phonograph, or any of the great inventions in the evolution of books and their keeping, has affected the present state of things.

§ 22. *Bibliography*

The best first source for a general idea of primitive libraries is the readable and well illustrated little book of Edward Clodd called *The story of the alphabet,* (N. Y., Appleton, 1912).

With this may be put the still briefer first part of Dr. Fritz Specht's *Die schrift* (Berlin, 1909. 3rd ed.).

More extensive general treatments are found in Berger's *Histoire* (Paris, 1892), and quite exhaustively in Wuttke's *Die entstehung der schrift* (Leipzig, 1872), also in W. J. Hoffmann's *The beginnings of writing* (N. Y., 1895), a sketchy but comprehensive survey.

For the definition of the library see Graesse Schmidt and the other treatises on library science, especially the older ones.

For libraries of the gods see the various works on comparative mythology under the topics of the various writing gods, Hermes, Thoth, Odin, etc., or better, since the subject has not been very much worked up, in the sources The Eddas, The Book of the Dead, The Avesta and for the Indian matters Muir's *Sanskrit texts.*

In the matter of antediluvian libraries see the references in Schmidt and Richardson, but especially the sources gathered as pseudepigraphic literature of the Old Testament first by Fabricius but now to be had in more modern editions.

For animal, plant and memory libraries see the literature of so called "Comparative psychology" given in admirable detail annually in the Psychological index—looking up the articles on inward speech and writing as well as on memory.

For Preadamites see Winchell's *Preadamites* (Chicago, 1880), and the works of M'Causland.

For prehistoric and borderland libraries generally in the Mediterranean region the various works of Mosso may be consulted, especially the *Dawn of Mediterranean civilization.* Ch. 2. pp. 11-43 The Origin of Writing and still better Evans, *Scripta Minoa* which is a classic.

For prehistoric western Europe, J. Déchelette's *Manuel d'archéologie prehistorique Celtique et Gallo-Romaine,* v.1., (Paris, 1908), is most comprehensive for a first survey of a very extensive field.

In the matter of primitive tribes Frobenius' *Childhood of man* (Philadelphia, 1909), although curiously sketchy and aggravatingly brief, seems to be authoritative enough, and certainly gives the layman in these matters a good idea in short space of the anthropological aspects of the subject.

One of the very best sources easily accessible to all for getting first clear impressions as to the use for record by

primitive man of all the prephonetic methods of record is F. W. Hodge, *Handbook of American Indians North of Mexico.* Smithsonian Institute, Bureau of American Ethnology, Bulletin 30, Pt. 1 and 2. 59th Congress, 1st Session, House Documents v. 61 and 62. Among the many articles some of the best, but by no means the only useful ones, are the following: Adornment, Calumet, Color symbolism, Dramatic representations, Engraving, Featherwork, Fetish, Hairdressing, Knots, Labrets, Mourning, Ornament, Painting, Pictographs, Prayer sticks, Quillwork, Scalping, Shrines, Sign language, Signals, Tattooing, Totem poles, Wampum.

Add to this for the African tribes Miss Kingsley's *West Africa* and Dennett's *At the back of the Black Man's mind.*

For the enormous literature on tattooing see the list of hundreds of books and articles in the catalogue of the Library of the U. S. Surgeon General's Office.

For the quipu an article by L. Leland Locke on *The ancient Quipu, a Peruvian knot record* is given in the American Anthropologist v. 14, 1912, pp. 325-32. This gives a modern point of view, has excellent illustrations and its author promises a bibliography of the extensive literature immediately.

For message sticks there is a long chapter with illustrations in A. W. Howitt, *The native tribes of South East Australia* (London, 1904, pp. 691-710).

An accessible first reference for pebble records and the abacus is the chapter on systems of numeration in W. W. R. Ball's *History of mathematics* (London, 1888), pp. 114-19, also, and perhaps even better, J. Gow's *A short history of Greek mathematics* (Cambridge, 1884), pp. 26-40. Cf. also article on the abacus in the Pauly-Wissowa Encyclopedia.

In the matter of the votive offerings W. H. D. Rouse's *Greek Votive Offerings*

(Cambridge, 1902), is a most suggestive and readable, while detailed and scholarly book.

On the Orphic tablets, see appendix to Miss Harrison's Prolegomena to the study of Greek religion (Cambridge, 1903), pp. 660-74, and text passim,—the text being one of the classics of modern comparative religion.

The end

INDEX